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The September number of the OPTHALMIC RECORD will contain a report of the proceedings of the Ophthalmological Section of the British Medical Association; an original contribution by J. Herbert Claiborne, M. D.; "A Probable Case of Thrombosis of the Lower Central Retinal Artery;" one by Joseph A. White, M. D.; "So-called Accommodation of the Lensless Eye;" one by Wm. E. Bruner, M. D.; "Traumatic Enophthalmos."

There will also appear reviews of the most recent contributions to Ophthalmology published here and abroad, editorials by prominent Ophthalmologists, society reports and miscellaneous items of interest.

The RECORD particularly desires short, practical papers on any subject connected with Ophthalmology. These will be published as early a date as possible. It is understood that, unless otherwise arranged, original articles when accepted are contributed to the RECORD exclusively. Illustrative cuts will be made at the expense of the journal and proofs for correction will be sent to authors when desired. Reprints with covers are furnished at cost. One hundred of these will be presented to authors *gratis* when a request for them is written on the original manuscript. The RECORD will be issued monthly and each number will contain about 54 pages of reading matter.

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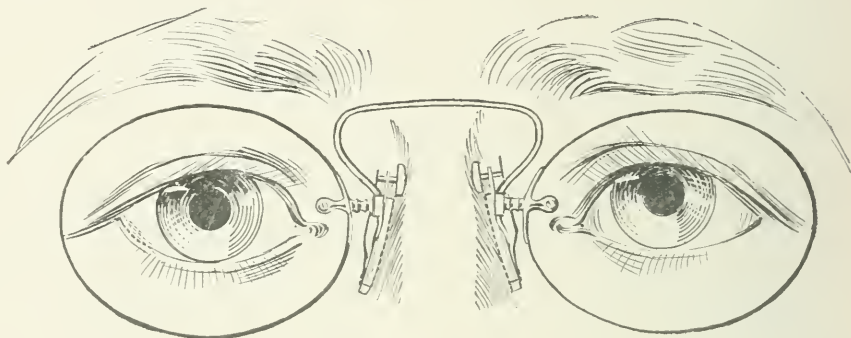
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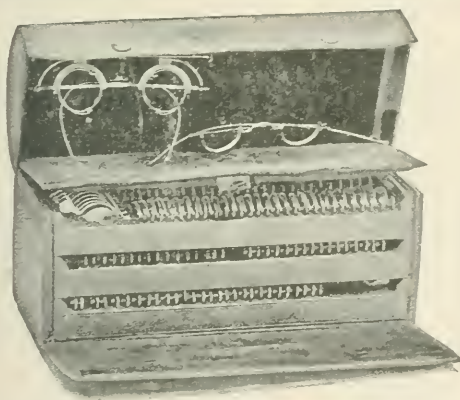
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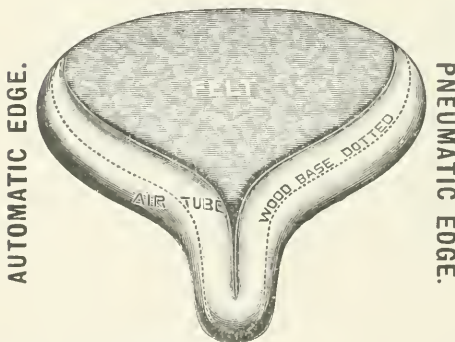
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THE OPHTHALMIC RECORD

A Monthly Review of the Progress of Ophthalmology.

VOL. VI.

CHICAGO, AUGUST, 1897.

NO. 8, NEW SERIES.

ORIGINAL ARTICLES.

GLIOMA OF THE RETINA.

By S. E. COOK, M. D.,

of Lincoln, Neb.

ILLUSTRATED.

Within the past two years it has been my fortune to examine a number of these tumors histologically, and I shall dwell especially upon their microscopical features in this paper.

Greef of Berlin has recently treated this subject very ably and completely in the *Deutsche Med. Wochenschrift*, obtaining his results by the use of the Golgi and Cajal methods of staining. This necessitates a special treatment of the fresh tissue, and the technical difficulties and capriciousness of the method are very considerable in the case of pathological tissues. I have used only the ordinary staining by logwood and eosin. The following case is so typical in its structure, besides possessing several features peculiar to itself, that I shall use it as a basis. The tumor was congenital, and the eyeball was enucleated when the child was six months old. The globe was enormously enlarged in all its dimensions, measuring $1\frac{1}{16}$ in. in its greatest diameter. The whole ciliary zone was staphylomatous. On section, the vitreous chamber was nearly half filled by an almond-shaped semi-solid growth, measuring $\frac{1}{8}$ inch antero-posteriorly, by $\frac{1}{2}$ inch transversely. The shrunken and degenerated vitreous incompletely filled the remainder of the chamber. The sclera was extremely thin. The flat and degenerated lens was pushed forward against the cornea, almost entirely obliterating the aqueous chamber, which still held only the wasted remnants of the iris. The optic nerve was shrunken to a mere fibrous cord. The tumor was well defined, but unsupplied with a proper enveloping membrane. It cut with difficulty, and con-

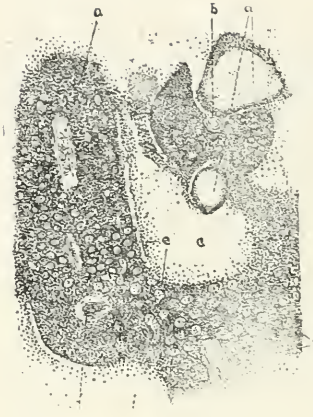


Fig. 1.—Cylinders of cells surrounding vessels. *a*. Longitudinal section of vessels. *b*. Cross section of vessels. *c*. Areas of degenerated cells. *d*. Deposits of lime. *e*. Whorls of cells, forming crypt-like structures. $\times 112$.



Fig. 2.—Whorls of epithelium-like cells. *a*. Large whorls. *b*. Small whorls. *c*. Area of degenerated cells. *d*. Deposit of lime. *e*. Cross section of vessel filled with cells $\times 600$.

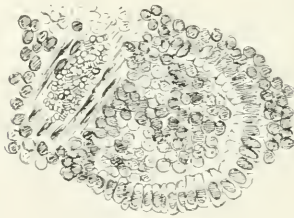


Fig. 3.

Fig. 3.—Large whorl with blood vessel.

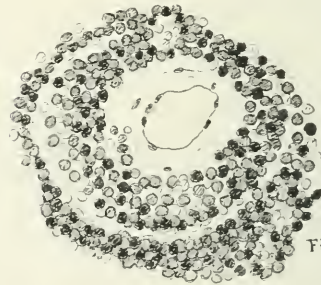


Fig. 4.

Fig. 4.—Cross section of vessel with thickened and degenerated walls.

tained, well distributed throughout its tissues, but more concentrated towards its center, myriads of granules of lime.

Microscopically, the tumor is exceedingly well supplied with blood vessels, interlacing with each other in all directions. The walls of many vessels are thickened and in a state of hyaline degeneration (Fig. 4). Each individual vessel is surrounded by a cylindrical mass of closely pressed, single nucleated, living cells (Figs. 1, *a* and *b*). The cell nuclei stain highly with haematoxylin and fill the cell bodies

almost completely. A very small amount of finely granular inter-cellular substance is visible, with here and there finely fibred bands of

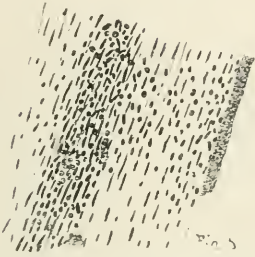


Fig. 5.—Cornea infiltrated with round cells.

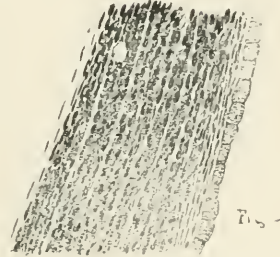


Fig. 6.—Choroid infiltrated with elongated cells.
x 600.

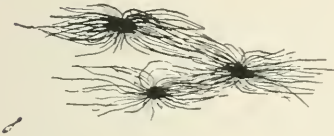


Fig. 7.—Neuroglia cells, also called Deiters' or spider cells.
(after Greef.)



Fig. 9—Small nerve cells.
(after Greef.)

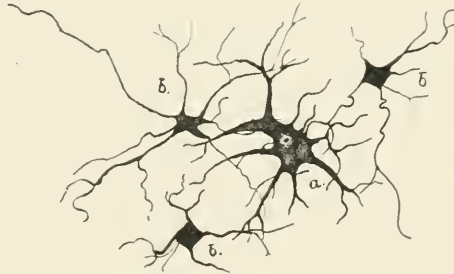


Fig. 8—Ganglion cells. *a*. Giant ganglion cell. *b* Medium-sized ganglion cells.
(modified after Greef.)

connective tissue. Outside of the cylinders of living cells, and filling in the interstices of the growth, are immense masses of degenerated cells (Fig. 1, *c*), which stain feebly or not at all. Numerous deposits of lime, (Figs. 1 and 2, *d*), well defined, and often showing the cell formation, are interspersed throughout the growth. They are in no definite relation with the vessels, and sometimes almost encroach upon the vessel wall itself (Fig. 1, *d*). Occasionally small hemorrhages are seen. Two classes of cells are distinguishable in the tumor, viz., round cells, with a scanty amount of protoplasm, and resembling the cells of the nuclear layers of the retina, composing the bulk of the tumor, and elongated cells arranged in whorls (Fig. 2, *a* and *b*, also Fig. 3), resembling the corolla of an ox-eye daisy. In some portions of the tumor these whorls are very numerous (Fig. 1, *e*), while in other parts they seem to be

wholly lacking. At one point a thin-walled vessel is seen to be completely filled with the tumor cells (Fig. 2, *e*), furnishing an illustration of the manner in which extension to distant organs may occur. The tumor has appropriated to itself almost the entire retina, as only a small and almost unrecognizable fragment of it can be discerned. The choroid is wasted and infiltrated, in places, with closely pressed and flattened cells (Fig. 6). This shows how the tumor extends by contiguity. Here the cells are not arranged in whorls.

In regard to its cell forms, glioma of the retina resembles glioma of the brain. It differs from the latter, however, and indeed from all other tumor formations, in the peculiar arrangement of its cells. If the tumor be not too advanced and is still intra-ocular, and the vessels be not too numerous, the living cells are arranged in a cylinder or zone around each individual vessel. Filling in the remainder of the tumor, are masses of degenerated cells. The line of demarkation, separating the two cell areas, is sharp and pronounced. This arrangement of cells has been described, but only as an exception and not as the rule, and has given rise to the name of cylindro-glioma or angio-glioma. Wintersteiner, who has examined many cases, considers this arrangement as the rule, in cases at all advanced in development. In fifteen cases examined by Greef this structure was found more or less constant. In all the cases I have seen the living cells were grouped in cylinders around the vessels.

It is probable that this peculiar structure is entirely the result of increased intra-ocular tension. The cells are embryonic in character and multiply rapidly, but are of a very low order of vitality, and die easily when subjected to unfit conditions. When the tension in the eye-ball becomes increased, as it always does in cases at all advanced, the cells at a distance from the vessels are insufficiently nourished and degenerate and die. Greef found this arrangement of cells constant in tumors the size of cherry stones. In all cases, however, which had burst through the sclera, the extra-ocular growth ceased to show this characteristic cylindrical formation, but resembled precisely glioma of the brain. As long as the tumor is confined to the eye-ball, its growth is slow and its nourishment difficult. As soon, however, as it has burst through its ocular prison walls, there ceases to be interference with its nourishment; the growth, which heretofore was slow, rapidly increases; the formation of new vessels becomes accelerated; the cell degeneration almost ceases; and the tumor assumes all the characters of unfailing malignancy. In its finer build, retinal glioma corresponds,

in general, with glioma of the brain. By teasing fresh specimens, Leber found the protoplasm of the cells running out into numerous fine interlacing processes, resembling and analogous to Deiters' cells, found in glioma of the brain. Vetch also found these cell forms quite often, according to the freshness of the specimens. In regard to the peculiar whorl-like structures (Fig. 2, *a* and *b*), which I do not think are present in all cases, Becker described them in Graefe's *Archives* a few years ago, as also did Van Duyse, who designated such tumors as tubular glio-angio-sarcoma of the retina. They resemble cross sections of tubules lined with epithelium. They are not tubular however, but appear to form closed crypts. They may be connected with proliferation of the lymph sheaths surrounding the vessels, which, Van Duyse believes occurs in glioma. According to Greef, the mass of a glioma tumor consists of neuroglia or spider cells (Fig. 7), crowded together in great nests and bunches. Imprisoned and embedded in these nests, are giant and medium-sized ganglion cells, all with numerous branching processes (Fig. 8), and small nerve cells, with one, two or more processes (Fig. 9). These latter differ in form and size, and many intermediate and apparently transition forms are seen. He thinks these small and simple nerve cells are embryonic forms of the large ganglion cells. The spider cells also resemble the embryonic forms of neuroglia cells.

Cohnheim's theory as to the ultimate cause of new growths, would seem to have relevance here. He believed that there is an abnormality or irregularity in the embryonic rudiments of the part of the body in question—in short, that neoplasms originate from the growth of embryonic germs, or germinal cells, which have been, as it were, shut up in the normal tissues. In many individuals these tumor germs never become developed, but in others, through traumatism, mechanical and chemical irritation, etc., producing increased blood supply, and perhaps with diminished powers of resistance possessed by the surrounding normal parts, they become aroused to activity. According to the researches of Cajal and others, it is not infrequent to find in the normal retina misplaced cells, i. e., cells occurring in one locality which morphologically belong to another, as when cells belonging to the ganglionic layer are found in one of the granular layers. As a rule, these malpositions are without significance, but if aroused to activity, may produce a neoplasm.

Glioma is considered, by most pathologists, to originate in one of the granular layers, though usually in the inner one. It has been

found springing from the nerve fibre and ganglion layers as well, however. Indeed, if the tumor arise from the connective tissue framework, as is generally considered, there appears to be no essential reason why it should not find its origin in any layer of the retina.

Glioma is a growth peculiar to the central nervous system, and received its name from Virchow, who considered it to be the result of proliferation of the neuroglia cells of its delicate sustentacular framework. It is the only neoplasm occurring in the retina. It is much more frequently found in the brain, and occasionally occurs in the spinal cord and optic nerve. Retinal glioma is essentially a tumor of infancy and early childhood, and may be congenital. It practically never occurs later than the twelfth year, and indeed is very rare after the fifth year. It is occasionally double. Several children in the same family are sometimes affected. Fuchs saw two children in one family who died from the disease, while the third child had a congenital coloboma of the iris and choroid. He thinks that congenital failure of development may be an underlying cause.

The exact place glioma of the retina should occupy among the tumors, has been the subject of much discussion among scientists. Virchow believes the tumor to be akin to glioma of the brain, and has given it the name glioma retinae. He found many mixed forms in which sarcomatous elements were more or less frequent. To these he gave the name of glio-sarcoma. Ziegler, Rindfleisch, Delafield and Leber hold the tumor to be a small-celled sarcoma, and deny it a place among the true gliomata; Schöbl calls it a cylindro-glioma from its peculiar formation; Wintersteiner thinks it to be a neuro-epithelioma from its embryological descent; while Greef contends that it is a true glioma, holding in its meshes so many nerve elements, that it should be called neuro-glioma ganglionare. It seems to me that a proper regard for the embryonic origin of the tissues from which it springs, and the characters of which it assumes, would place this tumor in closer relationship with the carcinomata than with the sarcomata. The neuroglia is not true connective tissue, but is derived from the epiblast, and therefore tumors which partake of its embryonal characters are in their nature epiblastic. The epithelium of the skin is also of epiblastic origin, and has, as its type among the tumors, epithelioma. On the other hand, sarcoma arises from some structure of mesoblastic origin, and is built after the type of embryonal connective tissue, a product of the mesoblast.

The early recognition of glioma of the retina is a matter of vital

importance. In common with other intraocular malignant growths, it passes through three, and perhaps four, stages. In the first stage there are no inflammatory symptoms, although the eye becomes blind very early. The first objective symptom is usually the golden yellowish reflex, emanating from the pupil, sometimes noticeable at a distance, and even in the dark, which in pre-ophthalmoscopic times caused Beer to give the affection the name of "amaurotic cat's-eye." In this stage there are no subjective symptoms excepting blindness. As the growth slowly progresses it causes an increase in the intraocular tension, and the second or glaucomatous stage begins. Inflammatory symptoms and pain now supervene. This is the stage in which the physician usually first sees the case. As the growth increases, it creeps backward along the optic nerve, or bursts through the sclera forward, and the stage of extra-ocular growth begins. The tumor has now filled the whole globe, the sclera being partially softened and destroyed, and the tumor, being no longer confined by rigid anatomical boundaries, takes on renewed vitality, rapidly increases in size, and soon fills the whole orbit. It pushes forward the lids, and presents itself as an ulcerated, loathsome, painful, bleeding mass—fungous haematodes. It finally attacks the surrounding soft parts and bones of the face, or may follow the track of the optic nerve to the brain. Death, by exhaustion, or through implication of the brain, or by metastasis to other organs, is the final result. From its very inception the duration of the disease may be several years.

The only treatment is the earliest possible removal of the eye, being careful to remove as much of the optic nerve as possible. To be effective, enucleation must be done before the tumor has transgressed the confines of the globe.

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IS THERE EVER A SEROUS IRITIS WITHOUT AN INVOLVEMENT OF THE CILIARY BODY, OR CHOROID, OR BOTH ?

By WILLIAM CHEATHAM, M. D.

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My object in presenting this subject is to call attention to one of the many defects in our nomenclature of diseases of the eye, and have some suggestions made as to their correction.

I have never seen a case of Iritis Serosa myself without an involvement of both the ciliary body and the choroid with hyalitis, any one of these latter complications being as serious, or more so, as the involvement of the iris, from which the disease gets its name. My attention was first called to this subject in my examination of one of our students; the book he was using as a text book, in giving the complications spoken of, with the involvement of other tissues, the latter seemed to him to be of more consequence than the pathological condition observed in the iris. Only a few days ago a young man came to me complaining of gradual loss of vision of left eye for three weeks; V. R. E. $\frac{3}{8}$; V. L. E. $\frac{2}{8}$; no improvement by glasses. His iris was discolored, pupil sluggish, there was exudation on the posterior surface of the cornea,—a perfect picture of what the books call serous iritis. I

looked at the eye with the ophthalmoscope and his vitreous was so full of floating bodies, that I could get no view of the fundus. Such cases I can give by the score. After this young man's vitreous clears up I am sure I will discover spots of choroidal inflammation, and if central, the result will of course be serious. I again say I never saw a case of this affection but what we had an involvement of the whole of the uveal tract; why then call it serous iritis, when the name expresses really a minor part of the trouble?

Let us see what some of our leading authors say of this disease: Noyes, page 307: Iritis serosa was formerly called Descemetis, aquo-capsulitis, etc. Dr. Noyes on this page gives us the usual symptoms of this affection, and refers to a case in which Dr. Knies held an autopsy in 1879, and found that the whole uveal tract was involved as well as the sheath of the optic nerve up to the chiasm. The optic nerve was inflamed for a small area around the papilla. The deep part of the vitreous was liquified and detached; its anterior part permeated by granular cells and membranes. The disease, therefore, must be generalized as much more than iritis, and might perhaps be called, "Uveitis Serosa." Why then call it a serous iritis?

Juler, page 163, says: If the pathology of this disease as given by Treacher Collins is correct, "and there appears no reason to doubt it, this affection cannot any longer be considered an iritis, *per se*, but a primary catarrhal cyclitis, or as Priestly Smith suggests a serous cyclitis." I am sure he can truly add choroiditis to the iritis and cyclitis; on the same page Juler says, since cyclitis is an invariable accompaniment of this affection, etc.

Berry, page 135, says: This variety of iritis, which receives its name on account of the exudation being on the whole more serous than fibrinous, is almost invariably associated with a cyclitis or a choroiditis. He also refers on page 137 to involvement of the papilla and vitreous. On the same page he says—"The etiology of serous iritis, or more correctly serous irido-cyclitis, etc."

With an involvement, then, of the ciliary body, choroid and vitreous, and sometimes the retina, optic nerve and its sheath, as admitted by all the leading authors on diseases of the eye, why do they call the disease Serous Iritis?

Other parts of our nomenclature are, I am sure, as defective, which indicates to me the importance of a revision. Some gentlemen may think that they have seen cases of serous iritis, *per se*, but I believe if more careful examination for involvement of the ciliary body

and the choroid be made, they will conclude as I have that the disease is an involvement of the whole of the uveal tract, or as Noyes says, a "Serous Uveitis," or even more; possibly with involvement in all cases of the vitreous, and in a majority of them of the retina and the optic papilla.

THE RELATION OF MALPOSITIONS OF THE MACULA LUTEA TO HETEROPHORIA.*

By G. MELVILLE BLACK, M. D.

Denver.

ILLUSTRATED.

The visual axis of the eye is an imaginary line drawn from the macula, the point of central vision, through the nodal point of the lens, passing through the cornea a little to the nasal side of its center. The optical axis is a line drawn from the posterior center of the sclera through the center of the cornea. Project these imaginary lines forward from each eye and the visual lines will converge and cross in infinity. The optical lines will run parallel to each other. There will be two angles formed between the two visual and optical axial lines with their apices at the nodal points of each eye; these are known as the angles *alpha*.

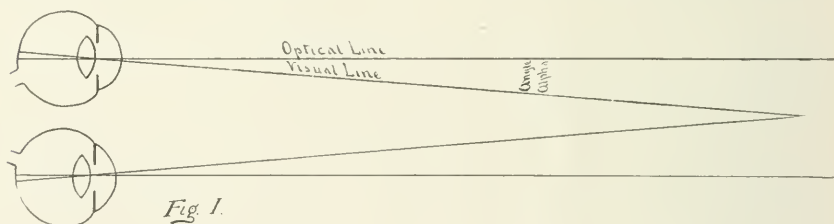


Fig. 1.

Landolt long since pointed out that the angle *alpha* differs in its size in different eyes. In high myopia the angle may be almost if not quite nil. In high degrees of hypermetropia it is greatly enlarged. This enlargement of the angle *alpha* is due to the situation of the macula. The macula is nearer the optic nerve in cases of high myopia, and further away from it in cases of great hypermetropia.

These are interesting facts upon which I propose to base the argument advanced in this paper.

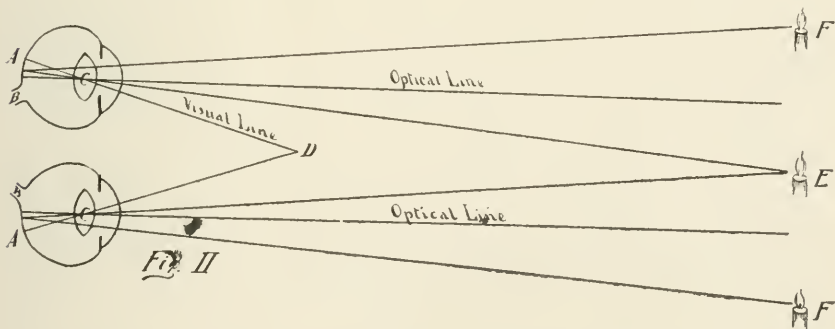
It is my purpose to point out the relation between diminished and increased angles *alpha* and heterophoria.

*Read before the Colorado State Medical Society June 15, 1897.

When testing for a refractive error, I have frequently suspected from apparent divergence a high degree of exophoria. To my surprise when I came to examine the muscles, I found esophoria. I have found in these cases of apparent divergence with esophoria, that the angle *alpha* was enlarged. In many of these cases there was little or no error of refraction, showing that nature does not always observe the same exactness in placing the macula in the same relative position in all eyes.

We have been taught to explain muscular abnormalities by two theories. The one having the precedent by reason of age is that of insufficiency, or weakness of the muscles, on the side opposite that toward which the eye turns. It is presumed that the weakness may be due to insufficient nerve supply, or to intrinsic muscular defects. The other theory is that the eye when formed was not given a set of muscles which, when relaxed, would hold the globe in such a relative position to its fellow that both optical axes would be parallel, and the visual axes converge at an infinite distance; instead, one or more muscles were too short and their opponents too long; hence, during complete muscular relaxation the globe would be turned in the direction of the short muscle, or muscles. Such turning constitutes heterophoria.

I shall now attempt to show that heterophoria may be produced by a different cause than those mentioned; that of malposition of the macula lutea. If the macula is placed too close to the optic nerve or too far from it and the muscular adjustment is for an eye with the macula in its normal position, heterophoria must result if the muscles are completely relaxed.



The above diagram shows a condition in which the macula (A) is

situated too far from the optic nerve (B). A line drawn from the macula through the nodal point (C) meets its fellow but a short distance from the eyes (D). Rays of light coming from infinity (E) strike the retina between the optic nerve and the macula, and according to the laws of retinal projection, are projected outward, with resulting homonymous diplopia (F). To overcome this false adjustment the external recti muscles must turn the cornea outward thereby turning the macula inward until the rays of light coming from infinity (E) fall upon the macula. The eyes, in accordance with the law of binocular single vision, have acquired this habit of turning out until diplopia no longer exists. We have as a result apparent divergence, when our muscle tests will show esophoria, which should, according to our former teaching, be due to convergence. It has been my fortune to meet with a number of such cases. A few typical examples will be found further on.

When the maculæ are situated too close to the optic nerve there will be apparent convergence, when our muscular tests will show exophoria. Again the macula may be situated too high or too low giving the appearance of sursum vergens, or deorsum vergens, which our muscular tests will show to be hyperphoria, if there is malposition of the macula of one eye only. If both maculæ are situated too high or too low, there will be a tendency of the eyes upward or downward.

I do not mean to say that all cases of heterophoria are due to malpositions of the macula, any more than I would venture to assert that all cases are due to long and short muscles or deficient nerve supply.

I believe I am justified in using the term heterophoria as descriptive of this condition. The word heterophoria means a leaning to one side. Dr. Stevens, I believe, judges by the visual axes rather than by the optical axes or corneæ. If he judges heterophoria by the turning of the corneæ, or by the optical axes, then some new term will have to be coined when we take the visual axes as our standard. When testing the eyes for heterophoria with the Phorometer, we may have a turning out of the optical axes and corneæ and yet have esophoria because of an inward turning of the visual axes. As it is impossible for us to measure, with the Phorometer, anything except the position of the visual axes, it is fair to presume that Stevens did not err by taking the optical axes or corneæ as his standard.

It is possible to determine the relative position of the optical axes

and cornea by the Perimeter only; it is absolutely impossible with the Phorometer.

To determine the size of the angle *alpha* with the Perimeter, we place the patient in position before the Perimeter, cover one eye, and have him fix with the other a candle flame held a little above the center of the arc. The arc is turned in the horizontal meridian. A second candle is moved around the arc until the image of the candle is seen in the center of the cornea. The position of the second candle is read off in degrees by the scale on the arc, which represents the size of the angle *alpha* (the distance between the optical and visual axes.)

The angle Alpha when normal in size is about $3\frac{1}{2}^{\circ}$. In esophoria due to displacement of the macula the angle becomes larger, and in exophoria due to the same cause the angle Alpha becomes smaller, or completely coincident with the optical and visual lines, or the optical line may be situated to the nasal side of the visual line.

When displacement of the macula is suspected it is to be determined by the Perimeter, and it is by this instrument that I have been able to arrive at the positive conclusion that malpositions of the maculæ are responsible for many heterophoric cases.

Dr. Stevens has recently advanced a new theory, that esophoria and exophoria are due to too great upward rotation. His new instrument, the Tropometer, has been especially useful in determining the exact amount of rotation of the globe in all its directions. I am using the Tropometer daily in my office, and hope soon to publish my conclusions in regard to its general value. For the present, I am prepared to say that to explain all cases of esophoria and exophoria by too great *upward or downward* rotation must be fallacious, for neither will in any measure explain the esophoria and exophoria caused by malpositions of the macula, except where both maculæ are situated too high or too low.

As the above paper is already longer than intended, I shall publish only one case of malposition of the maculæ. It is the most interesting one in my collection.

J. R., Male, Age 40. Consulted me three years ago, complaining of eyes becoming easily fatigued both for far and near. Frequent supraorbital headaches. At times has great nervous exhaustion. I found at that time that his vision in each eye was $\frac{1}{8}$: improved to $\frac{1}{8}$ with + 0.50 cylinders axes 90. Muscular tests showed esophoria 9° with Phorometer. The esophoria was quite a surprise to me, for he:

had apparent divergence. I at once examined him with the Perimeter and found his angle *alpha* to be 10° in each eye. I prescribed his cylindrical correction and told him to report in three months, as he lived some distance from Denver. He came in in about six months reporting no relief from the use of glasses, and that he got along better without them. Upon testing his muscles I found he had 10° esophoria. I prescribed 3° prisms, bases out, over each eye. He reported at the end of a month's time that he was no better. I now found he had 22° esophoria. I did a tenotomy of right internal rectus muscle leaving 3° esophoria which in a week's time increased to seven degrees. I then gave him 3° prisms, bases out, over each eye, and asked him to report in a month's time, which he did, when I found 14° esophoria, I now performed a tenotomy of the left internal rectus muscle. The immediate result of this operation was 2° exophoria which in few days time disappeared, orthophoria resulting. He now had a very apparent ocular divergence.

He returned home and wrote me some four months afterward, that he was having no more headaches, and that "his nerves were stronger," but that his eyes became tired easily upon use, and were sensitive to light, I advised him to return and found esophoria 7° , but as his divergence was quite marked, so much so that his friends called his attention to it, he did not want any more operative work done that would increase it. He found himself so much improved, as his eyes annoyed him but little, that he preferred to leave well enough alone. I examined him by the use of the Perimeter again and found the angles *alpha* to be 10° each. He was in the city a short time ago, and called upon me. I found he had esophoria 8° , but he still preferred to leave well enough alone.

It will be observed that by the two tenotomies performed 33° of latent esophoria was overcome, and that 8° still remain uncorrected. The small amount of esophoria encountered when the eyes were first examined, in comparison with the large amount that actually existed, is to be explained upon the supposition that the external recti muscles, by turning the visual lines outward, thereby turning the maculae inward to maintain binocular single vision, had acquired additional strength. The external recti had become so in the habit of doing this work that when the diplopia test was made but comparatively small amount of the existing error was revealed at a time, because the externi did not relax, and it was only by the use of the prisms, by which the externi were in a measure relieved, that a larger amount of

the esophoria became manifest. When this was corrected by tenotomy, and the externi thereby still more relieved, the error continued to become more manifest, until a second tenotomy was warranted. It may be classed as a case of latent esophoria, caused by the maculæ being situated too far from the optic nerves.

OINTMENT OF THE YELLOW OXIDE OF MERCURY.

By WM. D. BABCOCK, M. D.

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One of the most used and important ointments is that of yellow oxide of mercury. There is great trouble to keep it in good condition. As usually dispensed it soon decomposes; and to be sure of always having it good it must be made fresh every few days. The light decomposes it, and, in the form we usually get it, the mercury falls to the bottom of the menstrum used.

S. Holth in the *Archives of Ophthalmology*, October 1895, gives the results of his observations. He had a two per cent ointment of the yellow oxid made up with vaselin, lanolin, and cold cream, either alone or in combination. They were placed under various conditions, and after a five months observation it was found in every case in which the ointment was exposed to sunlight, or diffuse daylight in the common pots, and in glass pots; grayish or black discoloration followed in a shorter or longer period depending on the intensity of the light independent of whether the pots were provided with covers. But when preserved in the dark there was no change in the salve.

This rather long introduction to a short subject matter is to call attention to an old, and almost forgotten way of making up the ointment which I believe prevents decomposition, and also precipitation of the mercury. It is easier to apply, and its efficacy is not impaired but rather increased by the addition of unusual ingredients. These are graphite and oleum Theobromæ.

R

English Graphite,	-	-	grains, 10.
Hydrarg oxid flav,	-	-	grains, 20 to 40.
Oleum Theobromæ,	-	-	ounce, $\frac{1}{2}$.
Butry Antimony, -	-	-	drops, 2.

Mix and make into pencils.

Instead of the butter of antimony any bland oil will do. When

properly made, and any good pharmacist can do it, it is very efficacious. The graphite in the ointment keeps the light away from the mercury, and prevents decomposition.

The graphite and the oil together will not let the mercury fall to the bottom of the mass.

In making the ointment, the mercury is rubbed up well with the antimony, the graphite is added gradually. The mortar is warmed, the oil of Theobromae, having been melted, is added gradually stirring all the time vigorously, and just before the mass begins to set it is poured into paper moulds that have been prepared. The best size of the moulds is about one and one-half inches long, and $\frac{3}{8}$ of an inch in diameter.

In applying the stick to the eyelids it is rubbed on lightly, and the eye being closed for about ten seconds the excess, if any, is rubbed off. If it is to be put into the eye a small piece is picked off, the heat of the fingers making it soft it is put in the eye between the ball and lower lid, or if a more thorough application is wanted, evert the upper lid and rub it on. In this form it is also a good application to any abrasion of the lips or nostrils.

THE COMBINATION OF CYLINDRICAL LENSES AND ITS OPTICAL EFFECT.

By DAVID KLETZKY,

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The effect produced by combining two cylindrical lenses, either + with +, or + with —, is a matter of great importance to every ophthalmologist. The simplicity of combining cylinders with spheres to produce sphero-cylinders, or sphero-cylinders combined to produce cross cylinders, or two + cylinders axis parallel, to make a stronger cylinder, or a + and — cylinder axis parallel, to diminish the refractive power of a cylinder, is taught in every text book on refraction. And, so far as my knowledge goes, I never could find in any text book on this subject, any other method of combining cylindrical lenses than the method mentioned above.

I shall endeavor to prove in this paper that two cylindrical lenses, + and — of 2.25 D. focus, have a power to produce nine combinations of cross cylinders, beginning with 0.25 D. and increasing by 0.25 D. to 2.25 D.; and, also, two cylinders, both +, say of 1.50 D., have a power to produce numerous sphero-cylinders, i. e., we can take two cylinders, say of +1.50 D. each, and convert them into five sphero-

cylinders of different combinations, beginning with 0.25 D. and increasing by 0.25 D. in one meridian, and decreasing by 0.50 D. in the meridian at right angles. The same rule holds good of — cylinders.

A few examples will make the matter understood. Let us take two cylinders, one + and one —, both of 2.25 D., and place them in the trial frame, which is marked in degrees, setting both cylinders at axis 135° , you will find them to neutralize each other. Now revolving each cylinder, the + cylinder 5° to the vertical, and the — cylinder 5° to the horizontal, you will then produce -0.25 D., axis 180° , and $+0.25$ D., axis 90° . For each rotation of 5° there is an increase of 0.25 D. in both meridians. The effect of this phenomenon is such, that from point of neutralization of the two cylinders to the quadrant, by revolving one cylinder from axis 135° to axis 90° , and the other cylinder from 135° to axis 180° , the full refractive power of the + and — cylinder is produced, and each cylinder moves through an arc of 45° , and through this arc, the two cylinders neutralize each other by 0.25 D. for each 5° .

To find the number of combinations we can produce from the point of neutralization to the point of greatest refraction, the following rule can be adopted: Assuming that we move each cylinder 5° from point of neutralization, we divide thus, $45 \div 5 = 9$, giving nine combinations. To find the refractive power of the cylinders needed to produce -0.25 D. in one meridian and $+0.25$ D. at right angles by rotating each cylinder 5° from point of neutralization, we multiply $25 \times 9 = 2.25$.

So with two cylinders of 2.25 D. each, one + and the other —, and setting the cylinders axis to axis at 45° , then rotating the + cylinder 5° nearer to the vertical, and the — cylinder 5° nearer to the horizontal, we are enabled to formulate the following:

Revolving each cylinder	$5^\circ = -0.25$, axis 180° .	$+0.25$, axis 90°
“ “ “	$10^\circ = -0.50$, “ “	$+0.50$, “ “
“ “ “	$15^\circ = -0.75$, “ “	$+0.75$, “ “
“ “ “	$20^\circ = -1.00$, “ “	$+1.00$, “ “
“ “ “	$25^\circ = -1.25$, “ “	$+1.25$, “ “
“ “ “	$30^\circ = -1.50$, “ “	$+1.50$, “ “
“ “ “	$35^\circ = -1.75$, “ “	$+1.75$, “ “
“ “ “	$40^\circ = -2.00$, “ “	$+2.00$, “ “
“ “ “	$45^\circ = -2.25$, “ “	$+2.25$, “ “

The combination of two + and two — cylinders is almost on the same principle as the — and + combination. Both the arc of revolution for each cylinder is 15° less, i. e., we only have 30° of revolution for each cylinder, and therefore less combinations are produced. The reason for this is that, by placing two + or — cylinders of equal refractive power axis to axis, we produce one cylinder, and double the refractive power. And, by rotating the axis to assume an arc of 30° , no neutralization is produced, i. e., the same refractive power will be maintained as if they were axis to axis. The reason for this, I am now unable to explain. By revolving the axis of the cylinders from the 30° arc to a larger arc, sphero-cylinders are produced. The refractive power of the sphero-cylinder depends on the number of degrees through which the axes of the cylinders are revolved.

To find the number of sphero-cylindrical combinations we can produce by combining the two + or — cylinders of equal refractive power, we must first deduct the number of degrees that the cylinders maintain the same refractive power. This number is 15° for each cylinder, so neutralization begins from this point to the point where the axes cross at right angles. This makes a rotation for each cylinder of 30° , and here we get a simple sphere.

The same rule can be adopted to formulate the result of neutralization by two + or — cylinders as has been adopted for the cross cylindrical combinations, remembering that the arc of revolution is here 30° instead of 45° . (Formula) Assuming that we move each cylinder 5° from point of simple cylindrical refraction, we divide thus: $30 \div 5 = 6$, giving six combinations, five sphero-cylindrical combinations and one spherical when the axes of the cylinders are at right angles.

To find the refractive power of the cylinders needed to produce 0.25 D. in one meridian with a rotation of 5° of the axis of each cylinder, we will multiply $25 \times 6 = 150$. So with two cylinders of 1.50 D. each we are enabled to formulate table No. 2. Cylinders each of +1.50 D. we set one cylinder axis 75° and the other axis 105°

Revolve one to 70° , one to 110°	= +0.25 sph. combined +2.75 cyl. 90°
“ “ “ 65° , “ “ 115°	= +0.50 “ combined +2.25 “ 90°
“ “ “ 60° , “ “ 120°	= +0.75 “ combined +1.75 “ 90°
“ “ “ 55° , “ “ 125°	= +1.00 “ combined +1.25 “ 90°
“ “ “ 50° , “ “ 130°	= +1.25 “ combined +0.75 “ 90°
“ “ “ 45° , “ “ 135°	= +1.50 spherical.

The practical application of combining cylinders by this method is indisputable when an observer wishes to correct each meridian separately in ammetropia with the aid of the stenopaic slit. To make this method easily applicable, we can insert two cylinders, a + and —, in a small contrivance like Dr Risley's rotary prisms, and to this instrument attach a stenopaic slit which should revolve at any axis desired. The following refractive meridians can be produced with two cylinders, one + and the other minus, and with a rotation of 3° each.

Formula: $45 \div 3 = 15$ Beginning with a refractive meridian of 0.25 D. So $25 \times 15 = 3.75$ D.

Table 3, showing that with two cylinders of 3.75 D., one + and one —, having the cylinders arranged to revolve by turning a knob in the trial frame, and having a stenopaic slit in front, the following meridians are produced, + or —, in the same instrument :

3°	from vertical to horizontal	= 0.25 D.
6°	" " " "	= 0.50 "
9°	" " " "	= 0.75 "
12°	" " " "	= 1.00 "
15°	" " " "	= 1.25 "
18°	" " " "	= 1.50 "
21°	" " " "	= 1.75 "
24°	" " " "	= 2.00 "
27°	" " " "	= 2.25 "
30°	" " " "	= 2.50 "
33°	" " " "	= 2.75 "
36°	" " " "	= 3.00 "
39°	" " " "	= 3.25 "
42°	" " " "	= 3.50 "
45°	" " " "	= 3.75 "

DANGERS IN SLIGHT INJURIES TO THE CORNEA WHEN COMPLICATED WITH GRANULAR LIDS.

By J. W. HEUSTIS, M. D.,

Of Dubuque, Iowa.

There can be no doubt in the mind of any one who has investigated the subject at all, that granular lids, or perhaps more properly speaking, granular conjunctivitis is much more prevalent in some sections of this country than in others. This is especially true of those

portions devoted to the cultivation of grain. The majority of the farmers from whom we derive a large share of our practice in this locality, and who devote their attention to the raising of grain, or grass for seed, are especially liable to this trouble. So much so, in fact, that it is my universal custom to pay particular attention to the lids in all examinations of this class of patients. Granular lids, I have found, to be the almost constant accompaniment of the threshing machine. The patients do not complain so much of the lids nor do they realize their danger until the eye has received some injury producing an abrasion of the cornea. This, in two or three days, causes so much pain and annoyance that the advice of their physician is sought. Some times a cure is quickly accomplished, but very often the eye goes on from bad to worse till he seeks the specialist, who is often put to his wits' end to know exactly what is best to do. It has been my fortune during the past few months, to see quite a number of such cases, and without entering into a minute description, I wish to draw attention to some of the salient features of each and the general outcome of the different modes of treatment used.

Case 1 —A farmer while threshing timothy grass received some of it in his eye, which becoming imbedded in the cornea remained there for several days. It was removed finally by the family physician, who then sent him to me. On examination, vision = 0, an abscess being present covering four-fifths of the cornea. Lids were trachomatous, showing chronic granular conjunctivitis. Recommended a Saemisch operation, which was performed. The entire cornea sloughed. A bad prognosis was given at the time of the operation, as the eye was hopelessly gone when first seen.

Case 2 —Farmer while threshing got a piece of timothy grass in his eye, which remained in for some time and was finally removed by his family physician, who sent him to me for treatment. Examination showed some vision and a small abscess of cornea, trachomatous lids and chronic granular conjunctivitis of both eyes. A Saemisch operation was performed with good results. He recovered sufficient vision with which to get around, and will undoubtedly be still further improved by an iridectomy later on.

Case 3.—Farmer—Keratitis with ulceration aggravated by dust. Keratitis recurrent, but the ulceration had lasted only a week or ten days. The ulcer was dirty looking. He had been treated by an irregular physician for some time before I saw him, without improvement. Examination showed trachomatous lids and scars from which granulations had been squeezed. Treatment was at once directed towards the lids, which were thoroughly scraped with the small hoes made for that purpose. Atropin instilled and in ten days the patient was discharged. A month later he was seen and reported constant improvement.

Case 4 —Farmer —Ulcer of the cornea with keratitis of a recurrent nature. Had been treated by an irregular physician, who put in "something that burned." In this case the treatment was also directed to the lids, which were trachomatous

and showed chronic granulation. After several scrapings, the eyes made rapid improvement. This patient remained under treatment ten days and then returned to his home. One month later he returned for examination, and the eye seemed to be as well as ever.

Case 5.—Carpenter—Injury to the eye from a splinter. Examination showed abscess of the cornea and trachomatous lids together with chronic conjunctivitis. The abscess was on the lower edge of the cornea and was surrounded by a band of ulceration extending some distance in every direction. The treatment in this case was the galvano-cautery, which, after several applications, stopped the ulceration and sloughing process, and the patient has retained a fair amount of vision.

These cases, taken at random from patients seen during the past few weeks, will serve to illustrate my point, viz.: the necessity of paying more and immediate attention to the lids whenever and wherever we find a granulated condition in connection with an injury to the cornea. There is, in this condition of affairs, always a discharge; sometimes more and sometimes less. Given therefore an abrasion of the cornea or in fact any condition where the epithelial layer has been removed, presenting a place for infection, which must of necessity, be constantly bathed in the secretion present, there can be but one possible result, viz.: infection, from which will result an abscess, sloughing and ultimate loss of the eye. In all such cases, the first and most important step is to look after the lids. Get these into good condition and, as a rule, under proper sanitary conditions and a rational treatment, the eye will recover, showing perhaps no more of the injury or ulceration than a small leucoma. Allow the lids to take care of themselves or stopping in fact at any measure, except the removal of the granulations, the chances of saving the eye are reduced to a minimum. It will be noticed in Case V., that the actual cautery was first applied. This was done because the case had already gone on to the formation of an abscess and a slough, but had not gone so far that the eye was despaired of, and urgent measures were demanded to stop the process as quickly as possible in the hope of saving what remained of the cornea. So much has been written on the treatment of granular lids, that it seems almost ridiculous to say anything more, but I wish to add my bit of evidence and testify to the good results obtained from scraping the lids, which method of treatment I prefer to all others. With a good scraper to remove all the granulations, and an actual cautery to stop the process in the cornea, we have two weapons with which to fight those most troublesome conditions, viz.: granular lids and abscess of the cornea.

REPORT OF TWO CASES OF FOREIGN BODIES IN THE EYE.

By WARWICK M. COWGILL, M. D.,

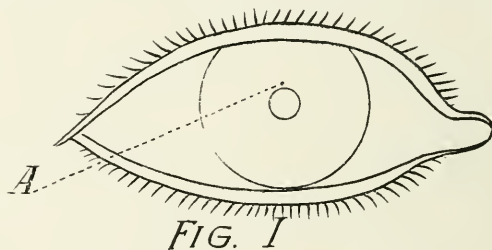
Paducah, Ky.

ILLUSTRATED.

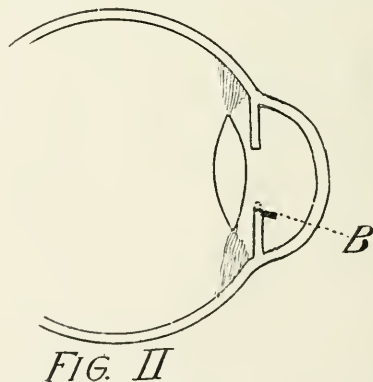
Cases of foreign bodies in the eye are of so common occurrence, that it is only those that possess some unique feature that are worthy of report.

The two following cases, I trust, possess sufficient of the unique to make them worth recording :

Case I —Mr. Gus. A. C——, aet 38. Two days before coming to me, while driving down an iron hoop on a barrel, was struck in the left eye by a flying bit of iron, measuring $\frac{1}{2}$ mm. x 2 mm. The iron passed through the cornea and trans- fixed the iris near its pupillary margin on the temporal side (Fig. 1), the free



end standing out into the anterior chamber, perpendicular to the plane of the iris. (Fig. 2.)



The foreign body did not pierce the lens, as I determined by its even movement consensuous with the movement of the iris in dilatation and contraction, remaining all the while in a position perpendicular to the iris.

The eye was slightly injected and the aqueous a little turbid. I will add also that the right eye was defective, owing to an extensive adherent leucoma of past

date. This fact added to the seriousness of the injury in the left eye and made the solicitude for saving it more intense.

The iron was so situated that should the aqueous escape, with it in its original position, it would be pressed backward into the lens, in which case the injury to the eye would be greatly increased and the extraction much complicated.

My plan of attack was, in doing the paracentesis, to pass the point of the keratome below the iron, and before the aqueous escaped to bring the blade up with a sweep and lay the foreign body flat on the iris. (Fig. 3.) This manœuvre I was fortunate enough to do suc-

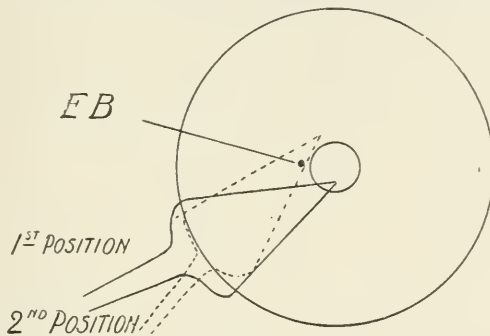


Fig. 3.

cessfully. Having the foreign body flat on the iris, with a pair of smooth-bladed forceps I removed the fragment of iron on the first attempt. The operation was done under cocain anesthesia, with bichlorid antiseptis.

The eye recovered perfectly without a trace of any injury having been done.

The patient was discharged on the eighth day, V., L. E. = $\frac{1}{5}$, w + 2.25 D.

Case II—Mrs. J. T. H.—, aet 34. Had been shot in the face and breast with a shot-gun loaded with squirrel shot some three or four days before I was called to see her, by Dr. P. H. Stewart, her attending physician.

The left eye was very much inflamed; chemosis; iritis; very tender on palpation; fundus cloudy from hemorrhage V. = 0. A glistening metallic spot (a shot) could be seen presenting through the iris into the anterior chamber at its lowest portion. She had been wounded in numerous places on face, neck and chest by the shot, but no sign of a wound could be seen on the eyeball or through the lid. Under chloroform narcosis, I attempted to remove the shot, but all efforts were futile. I enucleated the eye.

On examination the eyeball showed an opening where the shot had entered on the inner-posterior portion of the ball, one-fourth inch from the optic nerve entrance.

The shot had penetrated the orbit, struck the orbital wall and was deflected into the eye, passing through the eye from behind and presenting in the anterior chamber.

A REPORT OF THREE CASES

By JAS. W. DUNN, M. D.,

Cairo, Ill.

The following cases occurring in my practice present some interesting features :

Case I.—Miss N., a young unmarried lady, was sent to me about Nov. 1, 1896, by her brother-in-law, for the examination of an ocular trouble. I found the affection limited entirely to the right eye and consisting of a very slight protrusion of the ball and considerable lagophthalmus. The latter was due entirely to an elevated condition of the upper lid. The elevation amounted to about 5 mm., but the protrusion was scarcely discernible. There was no anatomical alteration in either lid as far as could be seen, and no history of trachoma, of any chronic inflammation, or any general trouble. The eye could be closed easily. Von Graef's sign was quite apparent, and the ball showed a slight tendency to roll up on the lower lid when the patient looked down. There was slight dryness of the conjunctiva; active pupil; no limitation of motion; no diplopia nor ametropia nor tachycardia. Her general health was good, better, according to her physician, than it had been for a number of years. She was, however, somewhat emotional and nervous, and her trouble was aggravated by any excitement, as an evening at the theatre or similar places.

Not being satisfied as to the diagnosis, we decided to treat the case tentatively for a while and await developments. She was given tonics and kept away from public places. This treatment was continued for about two months when her physician sent her to the eminent surgeon of the Marine Hospital here for his opinion. He advised strychnia, iodide of potassium and galvanic electricity. This treatment has been continued about five weeks.

I examined the case again the 10th inst. and found the eye symptoms unchanged except a lessening of the exophthalmos. Her physician, however, told me that he had noticed at times a slight pulsation in the carotid branches of the left side, but there was no tachycardia or enlargement of the thyroid gland. Putting this pulsation with the elevation of the upper lid and the slight protrusion of the eye I made the diagnosis of Basedow's Disease.

This seemed to be the most probable conclusion, though it is quite an obscure case and the symptoms somewhat irregular. It is not usual to see the ball protruded and the lid elevated before the other symptoms of exophthalmic goitre appear, and it is rare to see it limited to one side. The patient seems to be doing very well under tonic treatment and is gaining flesh.

Moran

Case II.—Chas. N., aet. 18, came to my office Oct. 15, 1896. The history of his trouble was very brief. He was standing over the window of a large flouring mill where he works. On closing his left eye to remove an accumulation of dust he suddenly became aware that he was blind in half of his right eye. He had nothing done for several days, but finally consulted his family physician, who sent

him to me. His condition was as follows: There was blindness in the upper field of the right eye extending from about 15° to 165° . The fixation point was untouched. The pupil was normal in size and activity; tension—1, and no pain. On examination with the ophthalmoscope and by electric light reflected from a head mirror (I found the latter method gave one the better view), I found a tumor occupying the lower half of the globe. The highest point was about the center of the eye measured from before back and from side to side with the eye directed straight ahead. Vertically, however, it reached only as high as the lower border of the disc. Carefully examined it appeared firm and nodular except down its anterior side which gave the appearance of detached retina. By having the patient look downward one could see over it behind the growth to a certain extent and thus appreciate its rounded form. It was grey in appearance and slightly pinkish. Small blood vessels could be seen running irregularly over it in various directions. A diagnosis of sarcoma of the choroid with retinal detachment in front was made and an enucleation advised. The patient, however, was allowed, at his insistence, to go to Chicago for confirmation of diagnosis. He entered the State Hospital at that place where he was kept under observation and treatment for about two weeks. The treatment was of a specific nature and given to clear up the diagnosis. Finally the eye was removed and the diagnosis confirmed by a microscopical examination of the growth. The patient was thus saved from a serious danger by prompt surgery.

The interesting features of the case are the facts that the patient must have been blind in a large part of his eye for a long time before he knew it, that he was quite young, and that the tension was decidedly subnormal, von Graefe making the point that a normal or increased tension is one of the things that distinguishes detachment of the retina due to intra-ocular tumors, from a simple detachment.

Case III—T. J., son of a Kentucky farmer, was out shooting birds with a muzzle-loading shot-gun about Dec. 1, 1896. A piece of a percussion cap flew off and passed through the nasal limbus of the cornea of the right eye, tore through the iris behind and imbedded itself in the lens. He was taken to the family physician, who probed the wound carefully but could not find the piece of cap. He was treated for seven weeks with the hope that the eye would heal up, but the pain and inflammation gradually increasing all the while he was brought to this city for treatment and fell into my hands. I found the eye very painful, greatly swollen, and the anterior chamber filled with pus. The lids were oedematous and the conjunctiva so swollen that it was pressed out over the lower lid in a roll as large as a pencil. There was anterior synechia, the lens and iris were much disorganized, and the eye appeared to be in a state of panophthalmitis. The left eye presented symptoms of a dangerous character. In it were great photophobia, lachrymation, slight murkiness of humors, sluggishness of pupil, failure of accommodation, pain, and circumcorneal injection. The ophthalmoscope showed the disc and retina to be hyperæmic. I advised enucleation of the suppurating eye at once, but expressed the fear that the good eye had already gone too far. The operation being consented to, the wounded eye was removed and examined and the offending copper found in the remains of the lens. The wound healed nicely.

Atropine was instilled into the left eye and the patient kept in doors. In a week's time the operation wound had almost healed and the other apparently completely recovered.

The remarkable feature about the case to me was the ready subsidence of the sympathetic trouble after it had seemingly become well established.

A CASE OF EMBOLISM OF A BRANCH OF THE CENTRAL RETINAL ARTERY.

By J. HERBERT CLAIBORNE, M. D.,

New York.

ILLUSTRATED.

A stout, thick-necked Italian of 38 years of age stated that while reading a newspaper in a street car about twilight he suddenly noticed that his left eye began to run water. At the same time the print became blurred. On closing his right eye he found he could not see how to read with the left except with great difficulty.

His left eye had a normal look when he presented himself for treatment and the pupillary reflexes were good. In looking directly into my face with the left eye he said he could not see my eyes or nose; the rest of my face was clear. A superficial examination of the field shows a small scotoma which was not absolute except for a small spot in the center. On testing him with colors he said that a small red square in the center of a white card looked black and that the surrounding card looked green. A green square on a white card was then shown him, and he said the card was green but he could not see the green square at all. His vision was found to be $\frac{3}{80}$ under homatropin several days later, with a correction of 1.50 D. of hypermetropia.

The ophthalmoscope showed that the region of the macula was slightly hazy, as if there were a small amount of serous injection there. The optic nerve was normal. Just at the lower and outer border of the disc a small artery came off from the lower central artery and ran towards the macula after having pursued a short course downward and outward. Just before it reached the macula it bifurcated in a prong-shaped manner. It appeared slightly constricted just after leaving its parent branch, then got nodular, then constricted again, and finally swelled once more, until just before it forked the caliber appeared largest. There were no hemorrhages. Three weeks afterwards the field was taken with the perimeter and the scotoma was still found to be relative except directly in the center, where there was a small spot of absolute blindness. This undoubtedly accounted for the fact that the patient had been unable to see the red and green square on the white card. He persisted in saying that everything white appeared to be green to that eye.

The snow on the ground he described as looking a distinct green. The vision had fallen somewhat at this time and may be described as $\frac{3}{80}+$. There

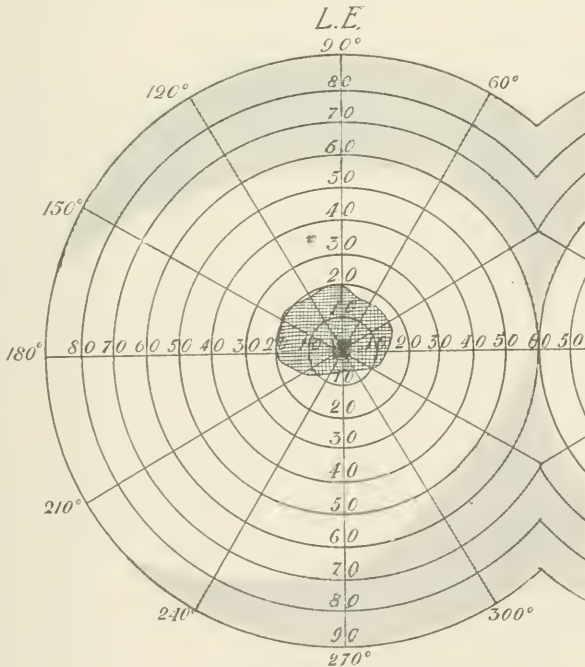
were no changes in the fundus except that the artery at its constricted points looked a trifle more thin and exsanguinated.

The patient was seen eight months later, when the field was found to be practically the same, with the relative scotoma and the small absolute one in the center. The optic disc was distinctly white to the outer side, suggesting the appearance of atrophy of the pupillo-macular fibres found in tobacco and alcoholic amblyopia. The artery was still exsanguinated and nodular at its origin from the parent branch, but appeared to be of a normal caliber toward the macula, near which it forked.

I could see no signs of anastomosis with cilio-retinal vessels.

The diagnosis in this case was not made without difficulty. By a superficial observer the constriction of the artery might have been easily overlooked. But it was present as I have described it, and this fact together with the physical characteristics of the man, the sudden onset of the blindness, the position of the scotoma in the field corresponding with the part of the retina supplied by the artery affected, made the diagnosis clear.

At times it happens that the circulation is restored in the part of the retina originally supplied by the plugged artery.



Some authorities think that this is due to a re-establishment of the lumen of the arterial canal. This explanation is not entirely satisfactory in some cases. Dr. W. A. Holden has shown in the *Archives of Ophthalmology*, 1893, vol. 22, p. 90, that occasionally collateral circulation is established by anastomosis of the plugged artery. He has shown this by drawings of the fundus in several cases.

The accompanying cut shows the position of the scotoma in the case herein reported. The crossed lines show the relative scotoma and the black central spot the absolute. The position of the entire blur corresponds with the portion of the retina supplied by the plugged artery.

REMOVAL OF A PIECE OF STEEL FROM THE VITREOUS
CHAMBER, THE POSITION OF THE FOREIGN BODY
BEING DETERMINED BY THE PRESENCE OF A
SCOTOMA IN THE FIELD OF VISION.*

By CHARLES A. OLIVER, A. M., M. D.,

One of the Attending Surgeons to the Wills' Eye Hospital; one of the Ophthalmic Surgeons to the Philadelphia Hospital, etc.

ILLUSTRATED.

T. W., a forty-three year old worker in a rolling mill at Tacony in this city reported at my clinic at Wills' Eye Hospital on the twenty-second of January of this year with the history of having been struck in the right eye by a steel-chipping the previous evening. He said that sixteen years previously he had had the same eye injured in a similar way whilst he was in India, but he felt sure that nothing had penetrated the organ, and that although he had always been slightly nearsighted, yet the sight of the two eyes had been alike until the second accident—since which time, vision was practically lost in the injured eye.

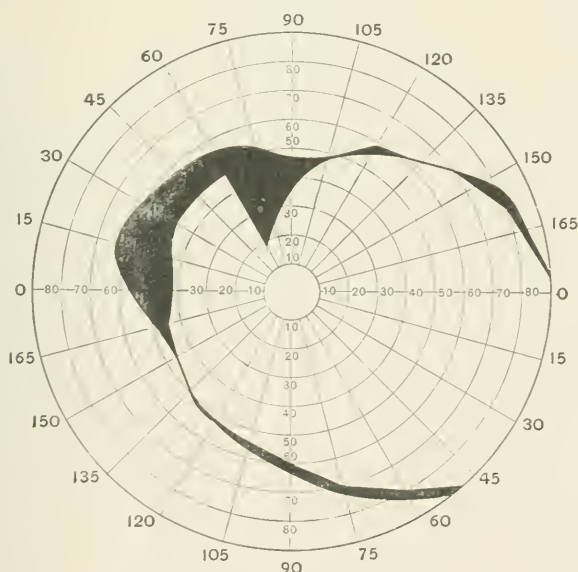
Examination of the affected organ showed both tarsal and ciliary congestion. There was an irregular perforating wound of about two millimeters in length in the upper part of the cornea reaching to the limbus. The entire corneal membrane appeared somewhat hazed. The iris was thickened and discolored, with a few almost imperceptible posterior synechiæ along its pupillary margin. In the upper portion of the iris in a position corresponding with the break in the cornea there was a triangularly shaped wound in the iris-tissue. The pupil was irregularly round about three millimeters in its horizontal meridian and the iris was quite sluggish in action. The lens was apparently

*Read before the American Ophthalmological Society at the Fourth Triennial Congress of American Physicians and Surgeons, May, 1897.

uninjured. The patient complained of decided tenderness when the ciliary zone in the region of the injury was gently palpated. No red-reflex even after pupillary dilatation had been affected, could be obtained from the fundus, the vitreous chamber being filled with thick sheets of freshly extravasated blood.

With the exception of a few posterior synechiæ, a thickening of the iris-stroma, and a sluggishness of reaction to light (the marks of an old iritis as in the other eye), the left eye failed to show any abnormality; its corrected vision being equal to $\frac{5}{5}$ and its field being normal.

Vision with the affected eye which was obtained by my friend and Assistant Dr. Edmund Canby, was limited to light-perception. The field of vision as shown in the accompanying chart, revealed the presence of a sharply defined absolute defect in its upper inner periphery.



Upon consultation, I proposed in view of the situation of the defect in the field of vision, to attempt to remove the supposed foreign body with a heavily charged electrode through an opening made rather far back through the sclera between the insertions of the external and inferior recti muscles. After agreement with the patient, that should I fail, I should be privileged to try obtain a series of radiographs (to get which at the moment were impossible), I admitted him into

the Hospital wards, anesthetized him, and immediately proceeded to operation, with the result that the moment the magnetized electrode was brought to the wound-edge, the metal chip sprang out of the opening and attached itself to the electrode without the necessity of inserting the instrument into the eyeball at all. Not a drop of vitreous humor was lost.

There was not the slightest reaction and the after-treatment was uneventful. The vitreous extravasations, which were found not to be very dense, gradually disappeared without causing any apparent disturbance, whilst vision for form and color increased until it is now rapidly approaching that of the fellow-eye.

PASSAGE OF A SHOT THROUGH THE EYEBALL.

By J. P. WORRELL, M. D.

Terre Haute, Ind.

ILLUSTRATED.

The following case of gunshot injury of the eye presents some unusual features that seem to warrant its publication. The record of the case recalled at this late date, after all active processes have ceased and after the ultimate condition has been reached, adds value to the clinical history and serves to point a moral as to the value of statistics based upon cases, the records of which are published within a comparatively short time after the injury has been received and claiming to record "final results."

On Christmas day, 1881, W. S. aet. 14, while playing, was struck in the right eye by a shot from a toy pistol in the hands of a companion standing some twenty feet distant. The injury had been received twenty minutes before his visit to my office. The ammunition consisted of a mixture of No. 4 and 6 shot.

Right eye somewhat injected. Cornea presented a small perforating wound from before backward reaching the limbus in its outer and upper part. The direction of the wound in relation to the corneal surface was so oblique that a valve-shaped opening was made, owing to which there had been no escape of the aqueous humor. Anterior chamber of normal depth. The aqueous, though slightly stained with blood, permitted a clear view of the iris. Pupil of normal size and position. In the iris, corresponding to the position of the wound in the cornea, was a round hole, $1\frac{1}{2}$ mm. in diameter, the outer edge of which reached



I.

the ciliary border of the iris. (Figure 1.) T.—? Projection for light good. No pain. The fundus could not be illuminated. It being possible that the shot might

have passed into the cellular tissue behind the ball and the determination of this fact having important bearing on the prognosis, I suspended the examination for the time, thinking that in that event evidence would soon be furnished in the appearance of hemorrhage from behind the ball. A bandage was therefore placed on the eye and the boy sent home.

After two hours I found a serous effusion distending the capsule of Tenon, being arrested in its forward progress by the attachment of the capsule to the eyeball. Directed instillation of atropia, compress bandage and confinement to bed.

December 26th. Passed a comfortable night. Ecchymosis and chemosis of subconjunctival tissue covering the inferior part of eyeball. No exophthalmos. Pupil irregularly and moderately dilated, that portion of iris in the neighborhood of the wound being swollen and encroaching on the otherwise round pupil. Faint reflex obtained from the fundus. A blood clot is seen lying against the upper and outer part of the posterior capsule. Diffuse opacity of vitreous. Counts fingers at 2'. On the third day eyeball slightly sensitive to pressure and some pain felt during movement of the eye; otherwise no discomfort. Pupil nearly round.

January 4, 1882. Eye continued to do well. No pain. Pupil almost uniformly dilated. Many large floating opacities in the vitreous, with their attachment in temporal region, float up and down with the movements of the eye. Says he can see my face very well, but the upper and right part (nasal field) is cut off.

Jan'y 10th. Progress uninterrupted. Counts fingers at 2'. Ecchymosis entirely disappeared. Sclera of lilac hue. Cornea under oblique light smoky. Anterior chamber deep. Pupil dilated symmetrically ad. maximum. No trace of wound in the iris. Lens clear. Fundus can be indistinctly seen, clearness of view diminishing as the temporal side is approached, where diffuse vitreous opacities prevent the recognition of any details. For objects, the nasal field is wanting up to near fixation point. Field, taken with candle, shows little or no limitation.

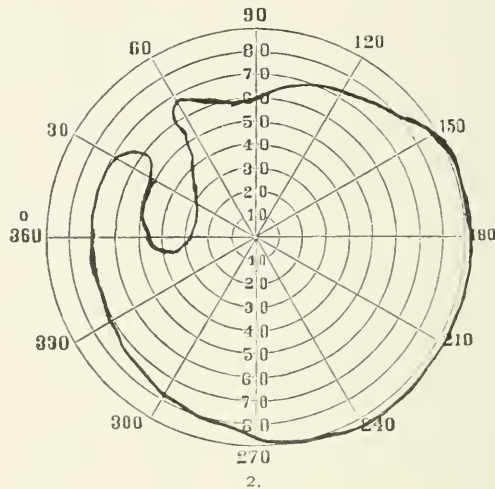
January 23rd. Diffuse opacities of the vitreous. The streamers stretching horizontally nasalward from the dense opacity of the temporal side persist. Between them, a view of the nasal side of the fundus up to and including two-thirds of the disc, can be seen and appears to be normal.

Feb'y 1st. Eye quiet. Sclera of a faint yellowish tint. Can obtain illumination of all parts of fundus. The transverse vitreous opacities much more attenuated. From a point above and to temporal side of macula a bright, greenish-white reflex, with sparkling points, observed. V. equals 15/L.

Feb'y 23rd. Atropia suspended ten days ago. Eye quiet. Sclera white. Cornea clear. Pupil normal in size and reaction. V.=15/XX?. Field taken with object shows slight diminution in upper nasal field.

May 1st. V.=15/XX? Eye quiet. Sclera white. Except in the temporal region, the vitreous had become comparatively clear, with small floating opacities and a few larger ones. The upper and superior segment of the posterior capsule is cut off by a greenish line, which appears to be the edge of a membrane running from before backward. Between this and the periphery of the lens the red reflex of the fundus is obtained. From the membrane backward and toward the macula run straight whitish, sharply defined bands, which unite at a point seen with a plus 5 D glass forming a crutch-shaped mass, from which radiate several other straight bands. Some of these are lost in the vitreous opacity of the temporal side, while others terminate by fringed ends in the clearer vitreous of the median region

Above this mass and between two of the bands is seen a patch of exposed sclera studded with masses of pigment. This is believed to mark the site of wound of exit. Field taken with white object showed a sharply defined tongue-shaped



defect in nasal side. (Figure 2.) The vision having apparently reached its maximum acuity and being entirely comfortable, no further record was made for a time, though the patient was occasionally seen. In the autumn of the same year he returned to school and passed from observation.

On January 27, 1883, he again appeared for examination and reported that he had recently observed a change in vision. He noticed circles of light floating from the temporal to the nasal side. Eye had never been red or uncomfortable. V=10/C. Field, when taken with object, showed extreme limitation in nasal side. Lens clear. Profuse vitreous opacities less, permitting a clearer view of the fundus, showing distinctly the atrophic area marking the wound of exit. The dense, sharply defined bands persist. Temporal region veiled by diffuse opacities. When the eye is turned to the extreme right, a red reflex is obtained from the equator. From a point between that and the atrophic area comes a greenish reflex and is believed to be due to a separation of the retina at that point.

Feb'y 22nd. There was observed for the first time upon the posterior capsule a flake-like deposit with sharply defined borders. This opacity varied greatly in size and shape from day to day. By the middle of March the deposit covered the entire posterior capsule effectually preventing study of the fundus.

Having given an unfavorable prognosis, the patient ceased to attend regularly and no further record was made until Dec. 1st, 1883, when I was surprised to find upon examination that these flake-like opacities had quite disappeared; but in the posterior cortex minute granular opacities were to be seen. Periphery of lens clear. The condition of lens now permitted a view of the fundus, which, however, was somewhat veiled. From a point just external to the atrophic area the greenish reflex, believed to be due to a retinal detachment, was still seen. The

reflex from the equatorial region on the extreme temporal side was normal. Vision had fallen to S/CC .

The record of the case here virtually terminated, though I find a field taken on April 13, 1885 with a candle as the object, which gave substantially a complete field, barring a large notch in the upper nasal quadrant. No other note.

In 1893, the patient being under care for correction of ametropia of the other eye, I found the right quiet, in a position of extreme external strabismus. T-?. Pupil somewhat dilated. Lens opaque, chalky white. No tenderness; no perception of light.

The above is an abstract of the very voluminous record of a case that at the time greatly interested me and in the final result of which I was greatly disappointed. The exceptional nature of the injury, the minimum damage done to the anterior portion of the eye and the escape of the foreign body from the ball, with but moderate amount of hemorrhage, made the case a comparatively simple one, which justified the hope that its termination might be the preservation of sight. This hopeful anticipation was strengthened by absence of all evidence of sepsis, the almost entire absence of inflammatory reaction, and the gradual clearing up of vision.

The prognosis of gunshot wounds of the eye is proverbially bad. Norris says, "The destruction at the point of entrance (and of exit if the shot pass through into the orbit) is so great, and the intra-ocular hemorrhage so large, that the eyesight is seriously impaired and usually irretrievably lost." A more hopeful view was entertained in this case on account of the exceptional freedom from injury of important structures. Barring the laceration of the vitreous and the injury to the coats of the eye at the point of exit, it appears from the subsequent history of the case that no injury was received, the result of which appeared as a factor in causing the final disorganization of the eye. We see the anterior chamber opened without loss of aqueous; the iris perforated without disturbance of its attachments; the ciliary region passed without involving the lens, or causing little if any injury to the ciliary body. All of these wounds healing without sequelæ may be eliminated in our estimate of the relative responsibility of the various portions of the injured tract for the final result. There remain but the injury of the vitreous and that of the posterior coats of the eye. I think a study of the case will also eliminate the wound of exit, leaving the secondary changes taking place in the lymph, and connective tissue masses in the vitreous to bear the entire responsibility.

The determination of the question as to whether a shot has passed through an eye or not has so important a bearing on the prognosis

that it is well to notice the light which was thrown on this case by the appearance of the effusion beneath the capsule of Tenon. I do not recollect having noticed any mention made of this, or of sub-conjunctival ecchymosis as an element in the diagnosis of passage of a shot through the ball into the orbit. While the determination of this fact in most cases will have no value in the prognosis in relation to preservation of sight, it will have weight in determining our course as to the retention or removal of the eyeball.

The unique character of the injury and the light which the progress of the case throws upon the prognosis of intra-ocular wounds justifies its resurrection from the records in which it has been buried for so long a time.

OPHTHALMIC THERAPEUTICS.—A REPORT

By G. MELVILLE BLACK, M. D.

DENVER.

The use of Argentinum Nitrate in the various acute and chronic inflammations of the conjunctiva has been so satisfactory that it is with reluctance that we are induced to substitute another drug for it.

Hove, (*British Medical Journal*, Oct. 17, '96) recommends Argentamin as a substitute for nitrate of silver, claiming that, owing to its being alkaline in its reaction, it causes much less local reaction when applied to the conjunctiva than nitrate of silver.

We all know that the smarting and general irritability of the eye after argentinum nitrate has been used has been one of the great drawbacks to its use. Hove claims that Argentamin is equivalent in every way in its results to silver nitrate, and is free from the many disadvantages of the latter.

I have been able to reduce the irritating effects of silver nitrate to a minimum by first instilling over the everted lids a four per cent solution of cocaine, then inverting the lids and waiting a few moments, then everting again and applying from a 1 per cent to a 2 per cent sol. of nitrate of silver, and with the lids still everted flushing the part with a normal salt solution. My experience has been that the results obtained are more satisfactory when the drug is applied in this manner, and that the patient suffers but little discomfort from its use.

The Journal of the American Medical Association, Vol. 28, No. 15. F. T. Smith reports a case of gonorrhoeal ophthalmia treated by Argonin in 5 per cent sol. with very satisfactory results. The eye had

previously been treated by the use of boric acid sol., bichloride sol., and nitrate of silver for two weeks without benefit. Under the use of Argonin, in four days time the discharge almost ceased, and the microscope showed but few gonococci, whereas previous to its use they had been very abundant. He claims that the use of Argonin is painless.

I am inclined to think that too many of us are afraid of strong solutions of nitrate of silver, whereas if the reverse were true, and solutions of silver of from forty to eighty grains to the ounce were used as above described early in gonorrhoeal ophthalmia we should not have occasion to look further for another abortive agent.

Archives Ophthalmology, part 2, Vol. XXVI. G. Herbert Burnham of Toronto advocates in "Indolent Creeping Corneal Ulcer" the use of a lotion of carbolic acid (1 to 20) dropped on the surface of the ulcer every two to four hours, day and night, with the instillation of a $\frac{1}{8}$ to $\frac{1}{4}$ gr. sol. of eserine 4 to 6 times in 24 hours. He also gives 3 grs. quinine internally four times a day.

This treatment should be productive of rapid and satisfactory results. It has long been my practice to cauterize such ulcers with pure carbolic acid, and use instillations of Formolin (1 to 1000) every three hours. We have in eserine a drug that should be more frequently used in corneal ulceration. The great contra-indication to its use is iritis, and even in iritis where the tension of the globe is found to be increased, an occasional instillation of eserine will be found to be of advantage, in that the atropine can be more frequently used. In corneal ulceration it is desirable to keep down the intraocular tension; eserine will do this, atropine will increase it, and yet we find a great many men using the latter as a routine practice.

Annals of Ophthalmology, Vol. V, No. IV. S. O. Richey of Washington, D. C., advocates the use of weak solutions of eserine of 1 to 4000 to 1 to 1000 with light taxis of the globe through the closed lids over the cornea and ciliary region. He claims that the taxis aids the contractile action of the pupillary muscular fibers, and empties the swollen veins of the fundus, and restores the iris and lens to their normal position. He also lays considerable stress upon the constitutional treatment to relieve high arterial tension. He recommends for this a general hot bath of from 105 to 108 F. together with the internal administration of sodium salicylate, ammonia, taraxacum and colchicum, with free catharsis from the use of Hunyadi Janos Water. This treatment is certainly rational, and especially so at this time when the

uric acid diathesis is claimed to play so important a part in the causation of many affections that have hitherto been without a known etiological factor. Again taxis will of itself reduce the intra-ocular tension. All that is required as proof is the manipulation of a normal eye through the closed lids for a few moments and the comparison of its tension with that of its fellow.

Journal of the American Medical Association, Vol. 28, No. 16. Frank S. Milbury, in an article entitled "Report of 76 Cases of Cataract Extraction with Remarks" says "on the third day the use of atropine is begun and continued twice daily." He does not say for how long. Such empiricism demands an answer. In this day of progression we demand a reason for the administration of any drug. If one cannot be given it would be better to administer nothing. The use of atropine as a routine practice after cataract extraction can certainly have nothing to recommend it. At times atropine would be indicated as it might be in many another affection. The majority of eyes after cataract extraction will get well much faster if they are left alone and the meddlesome practice abandoned of dropping various solutions into them, are in each case directly indicated.

Jacovides; (*Gazette hebdomadaire de medecine et de chirurgie*) speaks favorably of the use of Ichthyol in catarrhal conjunctivitis, phlyctenular conj., granular conj., purulent conj. and blepharitis. He uses a solution of this drug in water of from 30 to 50 per cent, and an ointment with vaseline base of from $2\frac{1}{2}$ to 5 per cent. He asserts that the first action of the drug is to cause smarting with injection of the conjunctiva, but that in fifteen minutes the vaso-constrictive action of the drug asserts itself and the pain subsides. He finds that the ointments are better borne than the watery solutions. I have been using watery solutions of Ichthyol in the various conjunctival affections for several years, and have not had occasion to discontinue their use. There are cases which do not bear silver well; and it is in these cases that I have found Ichthyol to be of most value.

Dr. Hasket Darby in the *Boston Medical and Surgical Journal* for June 3rd, -97 reports as follows on the new local anesthetic Holocain; "1st, it does not enlarge the pupil; 2nd, it does not affect the accommodation; 3rd, it does not increase the intraocular tension; 4th, it promotes antiseptics; 5th, it may be used when cocaine is contra-indicated." He finds that it does not contract the blood-vessels, and in consequence operations performed under this anesthetic are more likely to be attended with hemorrhage. He says it cannot be injected subcutan-

ously owing to its poisonous properties. He believes the anesthesia to be more profound than that obtained with cocaine. It would seem to me that its only advantage is that it does not dilate the pupil. While there are not many times that such an anesthetic is desired yet such occasions do arise; e. g., in the removal from the cornea of a foreign body which is loosely impacted, and which renders undesirable the closing of the eye afterwards. The annoyance to the patient derived from a dilated pupil is considerable.

CORRESPONDENCE.

TO THE EDITOR OF THE OPHTHALMIC RECORD:

SIR:—A recent article written by Dr. Frank H. Edsall, of Pittsburg, Pa., on "Some Causative Factors in Ulcerations of the Cornea," was antedated by one written by Dr. S. Lewis Ziegler, of Philadelphia, written for and read before the Pennsylvania State Medical Society May, 1894, and published in *New York Medical Journal* 3rd Nov., 1894. Both articles are very instructive and mean much to ophthalmic surgeons. In Dr. Edsall's paper he speaks of a latent cause in ametropia, which I believe is primary, weakening the resistance of both cornea and conjunctiva, rendering them susceptible to the nasal catarrhal poisoning.

Since reading Dr. Ziegler's article I've had but little trouble in treating phlyctenular cases. This little note is written to set right any mistake in priority.

Very respectfully,

JOHN S. KIRKENDALL, M. D.,
Ithaca, N. Y.

14 July, 1897.



REVIEWS.

A New Classification of the Motor Anomalies of the Eye, Based upon Physiological Principles.—By Alexander Duane, M. D., of New York, *Annals of Ophthalmology and Otology*, Oct., 1896, Jan. and April, 1897. This notable contribution to ophthalmology, being the prize essay of the College of Physicians and Surgeons of New York for 1896, has just appeared as a little book. (J. H. Vail & Co.)

“Based almost exclusively upon observations made by the author himself during the past ten years,” it bears throughout the evidences of great patience and industry in a most difficult field of research. More than this, a definite and practical object has been kept constantly in view, the author recognizing that “one who proposes a new classification must be prepared to defend his position by showing that it subserves some useful purpose.” This he has so done, that though some of his statements as to facts are open to serious criticism, and some of his clinical deductions are hence at variance with the experience of others, his work may justly claim the most careful study of ophthalmologists.

Much of the subject is familiar, and much original, while its scope is so wide that space requires that this review be rather critical than descriptive.

The new classification rests “upon a strictly etiological and physiological basis,” an evolution, as in the earlier classifications of other diseases, from the purely symptomatic, to the pathological and etiological features. Thus motor anomalies of the eyes formerly classified according to their symptoms as upward, downward, inward, and outward deviations, or according to Stevens’ classification, as hyperphoria, esophoria and exophoria, the author while admitting the provisional convenience of Stevens’ method, objects to it as a step backward by reinstating the idea of grouping deviations according to their anatomical expression and thus retiring their etiology to the background. Dr. Duane has simply gone farther onward in the etiological classification than his predecessors.

Following the various steps by which the proper classification of other diseases has been developed, Duane conceives that the problem of his classification is contained in the answers to the following questions: “(1) What are the different normal functions of the neuro-muscular

apparatus of the eye, and what is their anatomical seat? (2) In what way is it possible for these functions to be deranged? (3) What means have we for telling whether any special function is deranged or not, and, if so, what the nature of the derangement is? (4) What are the conditions actually met with in practice, and how do they correspond to the scheme we have framed?"

These questions are considered in the order named, the first involving the movements of the normal eye, that is, the actions of the individual muscles, the possible movements of each eye separately through co-ordination of its six muscles, and the character and extent of the movements actually performed by the two eyes when acting together. Most of these are demonstrated in tabular form.

The originality which characterizes the greater part of the essay is here conspicuously wanting. It is unfortunate that a correct knowledge of the physiology of ocular movements should be the weakest portion of the very foundation of the author's edifice. If the laws of Listing and Helmholtz are correct, the author's statement and conception of the position of the eye in every movement, except those directly up, down, in and out from the primary position, are incorrect. He states that from a study of his diagram of the field of fixation (which is most useful, and admirably conceived), "all the various applications of the laws of Donders and Listing may be deduced," not perceiving that these laws are absolutely antagonistic, those of Donders being founded upon the apparent, and those of Listing and Helmholtz upon the actual positions of the eye. Thus while in both tables and diagram the superior and inferior recti are rightly credited with both an adductive and torsional action according as in certain positions of the eye the belly of the muscle forms an angle with the visual line, the externus and internus are, inconsistently, and in the face of mechanical laws, denied elevating, depressing and torsional actions in all diagonal positions of the eye. (Helmholtz, Hering.) It follows therefore, that the position of the upper end of the vertical meridian of the cornea (and retina), and the actions of the several muscles in every diagonal position of the eye, as given by the author, are incorrect. This confusion is the result apparently of accepting the statements of minor authorities, and from neglecting *personal* experiment. Space permits of but one illustration:

If the eye be moved vertically upward and fixes a point on a distant vertical line, the image of which is formed upon the vertical meridian of the retina, and the head be then rotated around the *no*

vertical axis of the eye so that the latter looks upward and outward, and always immovably fixing the point and line, it is clear that the upper end of the vertical meridian of the cornea and retina will be inclined *in* toward the vertical plane of the head, *mainly by the external rectus*, the belly of which makes an angle with the visual line, and not be inclined out as stated by the author.

The physiological boundaries of the *field of fixation* have been carefully estimated, as well as the *amount of work done by each muscle in various movements*, but the results in the latter case are vitiated by the erroneous conception of the normal actions of the muscles. To illustrate, we quote :

"The maximum rotating effect of the superior rectus upon the vertical meridian (torsion effect) will be ascertained by determining the amount of deflection of the vertical meridian when the eye is directed far up and in. In this situation the vertical meridian is not acted upon by the other muscles capable of rotating it, [! E.] so that the total rotation which it undergoes must be ascribed to the action of the superior rectus."

In the above cited position, since (if Listing and Helmholtz are right), the vertical meridian is inclined *out*, the superior rectus cannot so incline it, but only modify the action of the internal rectus which *does* so incline it, the inferior oblique acting only as an elevator.

The determination of the *field of binocular single vision*, and of that of *binocular fixation*, and their differentiation are clearly set forth, as are also the phenomena of normal convergence, and the great excess of accommodation associated with actual convergence over that produced by prisms illustrated by the results of original experiments by the author.

In discussing the mooted question of the *true nature of divergence* being an active muscular contraction, or simply a relaxation of the interni, the author believes that it is "in part at least, an active process due to simultaneous contraction of the externi," a view borne out by three cases recently reported by Straub (*Centralblatt fuer Augenheilk.*, Jan., 1897), presenting symptoms of paresis of divergence without affection of the conjugate movements of abduction.

The *tests employed* are next considered with directions for applying them. These as given include inspection ; the screen (cover) test ; the author's parallax test ; equilibrium tests with Stevens' phorometer or "prisms in trial frame" ; test for divergence (abduction) ; determination of convergence near point both in the median line and in

lateral positions; test for convergence (adduction); diplopia test with candle, or card and dot, all of which tests the author states can be performed in ten minutes, and in addition, if requisite, the sursumvergence test and mapping of the field of fixation may be included. The author's methods of testing, and his estimation of the value of each, the tests and of their proper interpretation are valuable features of his work. As regards, however, the several equilibrium tests, it is likely that many experienced observers will not agree with Dr. Duane's in estimating their relative value, they holding that all of these should be made, as with Stevens' phorometer, with apparatus detached from the patient's face, not with a trial frame, which is largely responsible for the underestimation of the rod test, and renders prism tests often misleading and useless, and both tests contradictory to the phorometer, which, however correct, is far from being as delicate.

We come now to Part Second, which relates mainly to the pathology of the new classification, and includes clinical illustrations, diagnosis, prognosis and treatment. "The same principles which we apply to the physiology of the ocular movements, should also be applied to their pathology, * * * we should concern ourselves not simply with the disorders and weaknesses of the muscles as such, but also with the affections of all the various movements of which either eye alone or both together are susceptible." Duane then considers the question as to whether clinically we meet with pathological conditions which may be classified into groups corresponding with the physiological groups already given, and from "the results of the examination of quite a large amount of clinical material" answers it affirmatively, and then presents his *classification of the motor anomalies of the eye* in a synoptical table, the main divisions of which can only here be given, and then the more original applications considered briefly:

- (1) Anomalies of Individual Muscles or of their Nerve-nuclei;
- (2) Anomalies of the Association Centers for Parallel Movements;
- (3) Anomalies of the Center for Convergence-Movements; (4) Anomalies of the Center for Divergence-Movements; (5) Anomalies of Sursumvergence; (6) Anomalies of Rotation (Swivel or Torsion) Movements; (7) Mixed Forms. Many varieties including disorders of convergence-insufficiency or excess combined with divergence-insufficiency or excess. Each of the first five of these divisions are subdivided into the three forms of *under-action*, *over-action* and *perverted action*.

Before these divisions are taken up in detail, the phenomena of comitant and non-comitant deviations (preferred to the old terms with prefix *con*) are considered, and formulated into the following rules, which are clinically of great use :

"(1) *A deviation which increases or decreases in the performance of associated parallel movements by the eyes, signifies an anomaly of one or more of the ocular muscles—the direction in which it increases corresponding to that in which the action of the muscles affected is normally most pronounced.*"

"(2) *A deviation which remains constant or nearly so while the eyes are performing parallel movements is due, not to an anomaly of individual muscles, but to an anomaly of some one of the associated movements of the eyes.*"

"(3) *A deviation which increases as the eyes are converged denotes a convergence-anomaly, and one which increases as the eyes are passing from convergence to parallelism, a divergence-anomaly.*"

From a consideration, moreover, of the tendency of non-comitant to pass into comitant deviations, which is so common, the author enunciates the following law :

"A non-comitant deviation usually tends to become comitant, there being superadded to the morbid condition already existing, another by means of which the former is generalized and rendered sensibly equal throughout the whole field of fixation."

In the section on anomalies of the individual muscles the subject of paralyzes is passed over as having been "so thoroughly worked out and so ably presented by the two Graefes and Mauthner, that there is but little to add to this statement." Further, under this section, especially worthy of remark is the presentation of the symptoms and differential diagnosis of the different varieties of muscular over-action (spasm), and under-action (pareses and paralyzes), according to the author's own views, pointing out that the abnormality may affect either the muscle itself, its tendon, or the nerve or nerve-nucleus supplying it, and that it cannot be too strongly insisted upon that the resultant three varieties of deviations, "however dissimilar in origin, show in their symptoms and objective signs no real points of difference," and that hence the diagnosis must depend on the history, etc. He states also that when secondary changes have taken place the diagnosis between over-action and under-action is often impossible, but that before this has occurred the differentiation may be made by considering certain of difference which he gives in a table of con-

trasted symptoms, worthy of study. The principles to be borne in mind in diagnosis of paralysis and spasm, are given, and while not new, are succinctly illustrated by Duane's abbreviated diagnostic table as formerly published, to which is added similar tables of lateral and vertical diplopia. These tables are evidently partially theoretical, and based upon the (to the reviewer) erroneous conception by the author of the anatomical and physiological actions and coördinations of the normal muscles. A study of the tables gives this impression, and it is to be remembered that torsional anomalies due to one muscle are only to be detected in the earliest stages of its paralysis. It is therefore more than probable that in the diplopias recorded in the tables for the diagonal positions of the eye, the externi and interni are often in a state of spasm or paresis. This was certainly so in some of the early cases of paresis of the superior rectus, from the physical signs described by the author. (*Archives of Ophthalm.*, Vol. XXIII., No. 1.)

The treatment of anomalies of the individual muscles advocated, is according to clearly stated principles and appears eminently sound and rational, and Duane has done a great service if his warning be heeded that "It is probably from a failure to conform to these principles that a large part of the disappointment occasioned by the results of tenotomy done for heterophoria, is due."

As having little clinical importance we pass from anomalies of Associated Parallel Movements to the sections on Anomalies of Convergence and of Divergence, which, in their relation to "muscular asthenopia," both the plague and despair of the practical ophthalmologist, are the best every day guides we have yet met with. A large amount of useful knowledge is here compressed into small space, yet with a reason for every statement, and with a consistent relation to the plan of the whole work, and to the principles laid down from the first. After giving the conditions present in testing for convergence-insufficiency (under-action), it is considered as *non-accommodative* (due to weakness from operation, to divergence excess, or to insufficiency of an elevator or depressor muscle); and *accommodative* (due to non-use of accommodation, uncorrected myopia, to corrected hyperopia, and to presbyopia.) The treatment presents nothing new, and others beside the reviewer, may differ as to its being "a safe general rule to correct myopia, and under-correct hyperopia whenever much exophoria exists."

Convergence-excess is described along the same lines as its insufficiency, the physical signs being as remarkably clear, definite and

original in their grouping, as well as the causes, symptoms and the evidences of its complications with divergence-insufficiency.

Divergence-insufficiency and excess as distinctly different conditions from convergence-excess and insufficiency, are perhaps the most novel and valuable features of the author's classification, but most valuable of all are the tables of contrasted physical signs by which primary divergence-insufficiency, with secondary convergence-excess, is to be differentiated from primary convergence-excess with secondary divergence-insufficiency; and primary divergence-excess with secondary convergence-insufficiency, from primary convergence-insufficiency with secondary divergence-excess. A careful study of these points will convince those who have striven to solve puzzling cases of asthenopia, that many of them can only be solved by the facts and on the principles given in this record of the careful investigations of Dr. Duane. No review could give an adequate idea of their true value. Only when carefully recorded physical signs of cases are compared with his diagnostic rules, and the principles upon which these rules are founded, are understood, will the knotty points be made clear.

Above all it is to be hoped that American ophthalmologists will fairly weigh the merits of this classification, and that its author may some time in the near future produce a work on motor anomalies in which his observations along the lines he has so far followed, will be more detailed and full than possible within the limits of a prize essay.

F. B. EATON.

Cataract and its Association with the Gouty and Rheumatic Diathesis, etc.—By Dr. S. D. Risley, of Philadelphia, in an able paper read before the *Congress of American Physicians and Surgeons*, May 4th, 1897, discusses some etiological factors in diseases of the eye, which have been overlooked, or, to say the least, only meagrely considered by a large number of practitioners.

It is stated and pretty clearly shown that the etiology of not a few ocular affections common to middle life and old age, may be distinctly traced to some diathesis superinduced by faulty metabolism of the systemic tissues, rather than, as commonly current, to approaching age; for instance, as one would infer from *senile* in classifying hard cataract.

Doctor Risley assumes the logical position that it is unreasonable to expect the delicate nutrient membrana of the eye alone to escape disaster of a disease affecting the entire vascular tree, complicating

heart, liver and kidneys with generally impaired functions of nutrition. "It is not to be supposed," he says, "that under these conditions the ocular blood vessels can escape * * * or that the eye alone should escape the general impairment of the nutritive functions.

It is under these conditions that the ophthalmic surgeon encounters retinal arterio- and phlebo-sclerosis, the sero-exudate, and in other cases hemorrhagic retinitis, which indeed is only a great number of small retinal apoplexies, very significant and occurring usually in the later stages of nephritis, in perivasculitis, hemorrhagic glaucoma and the choroidal disease, which precedes and in a large measure is an etiological factor of incipient cataract.

These diseases producing a change in the structure of the blood-vessels of the nutrient membrana the choroid—a change which steadily progresses as the lithic acid or other diathesis interferes with the general functions of nutrition and systemic vascular degeneration, give accentuation to the various forms of eye disease, and furnishes a group of symptoms invaluable to the painstaking physician.

"It should be borne in mind that, while the lens loses its elasticity and becomes hard or even straw-colored as age advances, and by this manifests its participation in those inevitable changes quite correctly regarded as senile, it, nevertheless, is only in exceptional instances that it loses its transparency to a degree which seriously impairs the acuity of vision. It is, moreover, true that in many persons of great age, and in others where the signs of senility are exceptionally pronounced, the transparency of the lens is preserved to the last, as demonstrated by their excellent sharpness of vision. When, therefore, the lens undergoes not only physiological hardening, but becomes also opaque, it should suggest the presence of pathologic causes for this extraordinary occurrence."

It is not surprising that the lens and vitreous body, being avascular structures, should early suffer from impaired nutrition, especially when we consider "the unstable equilibrium of the component transparent cells of the lens" which are so readily disturbed "by qualitative change in its environing fluids. The peculiar susceptibility to change of the osmotic qualities of the fluids in and about the lens, being well known, still further inclines to this view.

The author contends, "that the gouty rheumatic diatheses are among the most frequent causes of chronic subacute forms of disease affecting the uvea."

Two illustrative cases are given which are of special interest to

me because I have treated very similar ones and find my experience corroborative of Dr. Risley's.

Mrs. S., age 62 years, consulted Dr. Risley in 1884, complaining of headaches in recurring attacks, at which times she suffered from photophobia, lachrymation, undue tenderness to palpation, etc. "The lenses were strongly reflecting and a few opaque speculæ were present in the lower and inner periphery of each. The retinal arteries were relatively small and had gray borders near the optic nerve. The veins were relatively large and dark with gray outline in places and in others granular borders. The choroid was honeycombed, while yellowish spots and splotches were distributed throughout the eye ground. * * * The details of the fundus were slightly blurred, * * * the anterior part of the vitreous filled with a fine sand-like deposit." She had high tension pulse, shortness of breath in exertion, no heart murmurs. Urine 1028, heavily loaded with uric acid. Recurring redness and tenderness of joints, chalky concretions and clear history of gout on paternal side for three generations. During the progress of the trouble her vision had fallen to $\frac{1}{2}$, with freely floating opacities in the vitreous. "To all appearances she is now the victim of rapidly maturing cataract. The present state has been reached by frequently recurring exacerbations of mild gouty attacks."

"Although it may not be possible to trace the degeneration of the lens fibres directly to the presence of uric acid or its salts in the nutrient fluids which surround it, it is highly probable that its nutrition suffers impairment through the disease of the membranes upon which it, in common with the other ocular tissues, depends for suitable pabulum." Further on he says: "I have, in three instances, seen curious and interesting changes suddenly occur in the refraction of diabetic patients during acute exacerbations of their disease presumably due to changes in the lens, which once more resumes its normal state when the great excess of sugar has disappeared from the urine, and presumably also from the tissues." Again, "Furthermore, it is a significant clinical fact, as bearing upon the conclusion of this paper, that the ectodermic structures of which the lens is one, and the connective tissue in and about the joints where it is most dense and comparatively avascular and, therefore, where nutrition is most easily retarded, are precisely the localities which suffer earliest and most constantly in the evolution."

"That the existence of advanced atheroma adds to the risks of operation for cataract is unquestionably true. This was demonstrated

in the case of an aged woman, already published, the subject of advanced atheroma, blind with over-ripe cataract in both eyes. The usual section was completed, but before the next step in the operation could be taken, she cried out with violent pain in the occiput. The lens was forcibly extruded from the wound and was followed immediately by a profuse gush of a yellowish vitreous fluid, and this by a stream of bright red blood, so copious as to run over the face and saturate the pillow. The brittle intraocular blood-vessels had ruptured under the removal of their usual support, afforded by the ocular tension, which was suddenly disturbed by opening the anterior chamber. The eye was of course lost, but what is of more significance in this discussion is the fact that a month later she became the victim of a fatal intra-cranial apoplexy."

A. W. CALHOUN.

BRITISH MEDICAL ASSOCIATION.

The OPTHALMIC RECORD has completed arrangements with the Wabash and Canadian Pacific Railroads for a rate to Montreal and return for those desirous of attending the meeting of the British Medical Association, to be held in that city, August 31st to September 3rd, inclusive.

Only those who have received invitations from the executive committee will be permitted to take part in the proceedings of the meeting, although any member of the medical profession and their families, who desire to make the trip to Montreal, are cordially invited to join the party.

It is the intention to leave Chicago from Dearborn station, corner of Polk and Dearborn streets, at 3:10 P. M., Sunday, August 29th, arriving in Montreal the following evening.

Special sleeping car accommodations will be provided for the party. The berth rate from Chicago to Montreal is \$5.00. Those desiring reservations made in the sleepers, or who wish further information should apply promptly to the Editorial Secretary, 1102 Reliance Building, Chicago.

ABOUT THE JANUARY "RECORD."

There have been so many unexpected requests for the first number of the RECORD that the edition is entirely exhausted. We would feel greatly obliged to those of our readers who may have received extra copies of the January number if they will return them to us at our expense.

THE OPHTHALMIC RECORD

A Monthly Review of the Progress of Ophthalmology.

VOL. VI.

CHICAGO, AUGUST, 1897.

NO. 8. NEW SERIES

EDITORIALS.

ILLUSTRATIONS OF MEDICAL AND SCIENTIFIC SUBJECTS.

In this age of progression "Of the making of books there is no end," many of which go unread or are but little considered on account of pages of dry description which might well have been avoided by even a crude illustration. A properly illustrated article is more apt to be accepted by the publisher and to be thoroughly read than one which is not. Illustrated papers are in demand by the general public and the pages of any technical work are brightened by the insertion of illustrations when necessary. "*One illustration is worth a page of description.*" The OPTHALMIC RECORD will always be found in the lead of journals of its class and the management is pleased to state that it is disposed to consider articles which are accompanied by well drawn illustrations. Even if crude, illustrations may be redrawn and thus be fitted for the pages of the RECORD. The beautiful plate on "Angioid Streaks in the Retina" illustrating de Schweinitz' article in the July number is an example of what may be done in reproductive work from first class copy. This was reproduced from a water color drawing of Margaretta Washington by the Binner Engraving Co. of Chicago by what is known as the 3 color process. It is in fact a colored photograph. The water color drawing is placed before a camera and 3 negatives taken; interposed between the drawing and the negative are screens which permit of the passage of yellow, red and blue light; prints are taken from these negatives upon sensitized plates which are chemically etched and finished only in part by hand; from these the separate colors are laid and printed. This is a modification of the photo-tint process as is used by the majority of magazines. It is much cheaper and more effective than wood engraving or lithography. Pencil or pen drawings, brush illustrations or old prints are likewise readily reproduced by this method.

H. V. W.

OPHTHALMOLOGY IN THE MEDICAL CURRICULUM.

As an indication of the improved status of ophthalmology in the medical curriculum, we draw attention to the number and quality of the following questions (there was no oral examination this year) submitted to the fourth year class in medicine of one of our leading universities. Attendance upon the lectures is compulsory, and the student must pass a satisfactory examination:

Examination in Ophthalmology, University of Pennsylvania.

May 19, 1897. Prof. W. F. Norris.

I. WOUNDS OF THE EYEBALL.

- a. Foreign bodies in the cornea, dangers, sequelae and treatment.
 - b. Perforating wounds of the eyeball.
 1. Where the lens is wounded in the pupillary space.
 2. Where there is prolapse of the iris, or where it is lacerated or cut.
 3. Where foreign bodies lodge in the vitreous chamber.
- Prognosis, sequelae, and treatment in each instance.

II. PURULENT CONJUNCTIVITIS.

In the adult and in the new born.

Causes, symptoms, diagnosis, course, sequelae, prognosis, treatment.

III. ULCERS OF THE CORNEA.

Describe the appearance of some of the principal varieties of corneal ulcer, e. g., those occurring in catarrhal, in purulent, and in phlyctenular conjunctivitis; also abscesses of the cornea.

Give the symptoms, sequelae, prognosis and treatment in each instance.

IV. IRITIS.

Anatomical and clinical varieties, symptoms, course, sequelae, and treatment. Differential diagnosis between iritis and acute conjunctivitis. Differential diagnosis between iritis and acute or subacute glaucoma.

V.

What are our standards of good vision, and how have we arrived at them?

What are the methods of testing the acuity of vision? What tests have we for the illiterate?

VI. ACCOMMODATION.

- a. What is accommodation, and how produced?
- b. What is the normal range of accommodation in a healthy emmetropic eye at the age of 25 years?
- c. What are the effects of myopia and hypermetropia on the range of accommodation?
- d. Name some of the principal drugs which we use to stimulate the accommodation and those which temporarily annul the accommodative power.
- e. Give the strength of the solutions of these drugs which are usually employed, and state some of the inconveniences and dangers which may result from their use.

VII. FIELD OF VISION.

- a. What is the extent of the normal field of vision?
- b. What are the methods of measuring it?
- c. What is homonymous lateral hemianopia, and what are the various ways in which it may be produced?

VIII. HYPERMETROPIA.

Definition, symptoms, sequelae, and treatment.

IX. ASTIGMATISM.

- a. What is regular astigmatism?
- b. What is irregular astigmatism?
- c. Symptoms.
- d. Effects on radiating lines and on letters.
- e. Give one of the simpler methods of finding the amount of astigmatism in any given eye.

X. GLAUCOMA.

Give its nature, varieties, pathology (methods of production), symptoms, prognosis, and treatment.

C. A. W.

OPHTHALMOLOGY AND GENERAL MEDICINE,

It has become extremely common in recent years for the young graduate in medicine to advance himself at once into the domain of the specialist, and this, without the training or experience in the general school that develops the chief requisite of the specialist, mature judgment. This is doubtless responsible for many evils, and tends undoubtedly, to lower the high level that expert specialism should al-

ways hold. In consequence, it forms a legitimate subject for editorial comment and criticism. This invasion of the youth of the profession is especially noticeable in ophthalmology, and its kindred specialties. Gynecology, the next most popular line of work is somewhat protected, as the patients themselves, demand a reasonable degree of maturity, and the operations are so responsible, dealing as they do with life itself, that the youth, fearful of the danger to himself, seeks other and more experienced aid. In ophthalmology, however, there is no such protection, and consequently, the step from the medical schools to the full-fledged oculist, is easy, and becoming more popular every day. I have been especially able to note this tendency during the last five years of my teaching life. In each succeeding class, a number of the students pass directly from the class room to the Polyclinic, pursue a course of from six weeks to three months and then begin their special life work. Sometimes they lack the grace of this small preparation and decorate their window with the word "Oculist," immediately on leaving college. And yet, the necessity for prolonged experience in general medicine, before taking up the problems to be met with in ophthalmology, is a very real one. The close relationship that many ocular diseases bear to the general system, the fact that many of the most serious lesions, met by the oculist, are directly caused by diseased conditions in distant organs, makes patent the necessity for more elaborate and exhaustive general training before one becomes exclusively devoted to special work. The remedies for this evil must rest either with the conscience of the practitioner, who must soon recognize the great injustice of his position to his public, or in the punishment that frequent failures bring.

W. E. H.

THE DUTY OF THE MEDICAL EDITOR TO MEDICAL SCIENCE.

The medical editor has to steer between the danger of discouraging able but inexperienced writers and that of allowing a large part of his space to be filled with more or less trashy material. A survey of our periodical ophthalmic literature certainly indicates that, up to a very recent period, American editors, with rare exceptions, have considered the first-named danger the more formidable. In other words, they have stood more in fear of their contributors than of their readers, with the result that many of the articles which they have

published display neither originality, novelty nor erudition. This not only wastes the readers' time and money (for the expense of printing unimportant articles necessarily raises the cost of the whole journal), but, what is more important, it constitutes a distinct obstruction in the path of scientific progress. The specialist, in the vast majority of cases, writes, not simply to unburden his soul, but to keep his name before the medical public, and if he can accomplish this by a series of mere pot-boilers, the temptation to neglect more serious work is one which the busy, the lazy or the ignorant man, however able, often finds impossible to withstand ; while if editors were to adhere rigidly to a high standard for admission to their pages, the same men would find the time or take the trouble to do really first-class work. This opportunity to elevate the standard of medical literature is one which no editor should hesitate to improve. By improving it, he may reduce the number of his original articles, but those which he publishes will eventually give to the stamp of his journal a value which the best men will appreciate. Offence will occasionally be given and feelings hurt, but the man who sends in an imperfect review of some well-ventilated subject will perhaps have his attention turned to better things, or at least may learn to save his time ; the observer or inventor who from inexperience or lack of library facilities is led to think his case more rare or his method more novel than the facts warrant, certainly, if he is fair-minded, should be grateful for the wider information which the editor may be able to furnish ; while the man with a well-established name who dashes off a hasty sketch of some rather unimportant case will, let us hope, on musing over his returned MSS., realize that he is one of those whose reputations need to be defended from themselves.

The insinuation above made, that much of the original matter in American ophthalmic journals has been trashy, may sound too sweeping. What is meant is that these journals (with one notable exception), along with a majority of really valuable articles, have published in nearly every issue, one or more contributions which would find no place in the best European journals ; not even in the more avowedly practical ones of Zehender and Hirschberg. Within the past eighteen months, however, there have been signs of a decided improvement in this respect, and if the ophthalmic profession will give it encouragement, the tendency toward a higher standard will doubtless continue.

H. G.

MISCELLANEOUS

BRITISH MEDICAL ASSOCIATION

The Sixty-fifth Annual Meeting of the British Medical Association will be held at Montreal on Tuesday, Wednesday, Thursday, and Friday, August 31st, September 1st, 2nd, and 3rd, 1897.

President—Henry Barnes, M. D., F. R. S. E., Senior Physician to the Cumberland Infirmary, Carlisle, Eng.

President-Elect.—T. G. Roddick, M. D., Professor of Surgery in McGill University, Montreal.

President of the Council.—Robert Saundby, M. D., F. R. C. P., Physician to the General Hospital, Birmingham.

Treasurer.—Charles Parsons, M. D., Dover.

An address in Medicine will be delivered by Wm. Osler, M. D., F. R. C. P., Professor of Medicine in the Johns Hopkins University, Baltimore. An address in Surgery will be delivered by William Mitchell Banks, F. R. C. S., Surgeon to the Liverpool Royal Infirmary. An address in Public Medicine will be delivered by Herman M. Biggs, M. D., Director of the Bacteriological Laboratory of the Health Department, New York City. The Scientific Business of the meeting will be conducted in Eleven Sections.

THE SECTION ON OPHTHALMOLOGY.

President: Edward Nettleship, F. R. C. S., London. *Vice-presidents*: F. Buller, M. D., Montreal; R. A. Reeve, M. D., Toronto; Ed. Desjardins, M. D., Montreal; A. A. Foucher, M. D., Montreal. *Honorary Secretaries*: W. H. Smith, M. D., Winnipeg; Jehin Prume, M. D., Montreal; Thomas Herbert Bickerton, M. R. C. S., Liverpool. It is intended that a discussion should take place on the Prevention of Accidents to the Eyes of Persons Engaged in Industrial Employments. The following gentlemen have expressed their intention of contributing papers to the section.

Bickerton, T. H. (Liverpool) (1) The Question of Color Vision in the Public Services; (2) on Mules Operation.

Buller, Dr. F. (Montreal) Abnormalities in the functions of the Extrinsic Ocular Muscles.

Foucher, Dr. A. A. (Montreal) Auto-infection in Pustulous Keratitis,

Fulton, Dr. John F. (St. Paul, Minn.) Amblyopia of Strabismus.

Jehin-Prume, Dr. Jules (Montreal) A Contribution to the treatment of the Syphilitic Affections of the Eye.

Lee, Charles G. (Liverpool) On an Unusual Case of Orbital Tumor.

Würdemann, Dr. H. V. (Milwaukee, Wis.) Relation of Skiascopy to other Objective and Subjective Methods for the Estimation of the Ocular Refraction (with exhibition of Hand Skiascope).

Specimens.—Specimens will be shown by Mr. Treacher Collins and Mr. Priestly Smith. (*British Medical Journal*.)

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 My mind is quite distraught;
 I seem to see
 In front of me
 A most gigantic spot.

Light scintillates behind it
 And figures seem to dance;
 Sometimes a limb
 Shoots from the rim,
 A head or heads perchance.

The spot is most uneven,
 And often broad and high,
 On which erect
 Great plumes project,
 Of network ply on ply.

I've reached descriptive limits,
 And now, I'll draw for you
 A silhouette,
 That you might get
 A satisfactory clue.

GEO. R. BRILL.

—*Louisville Times.*

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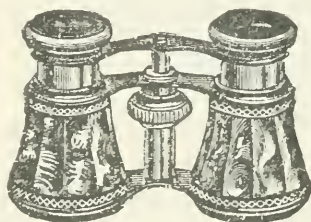


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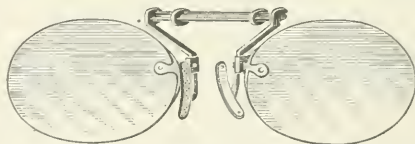
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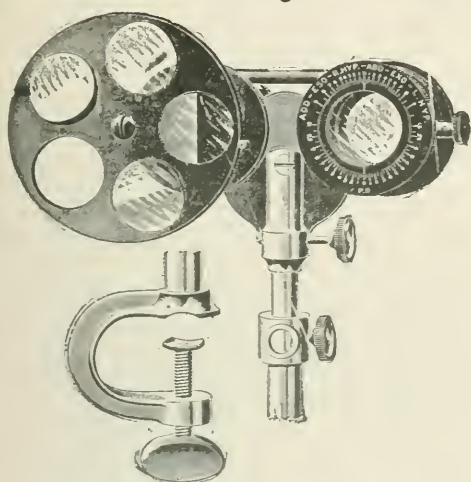
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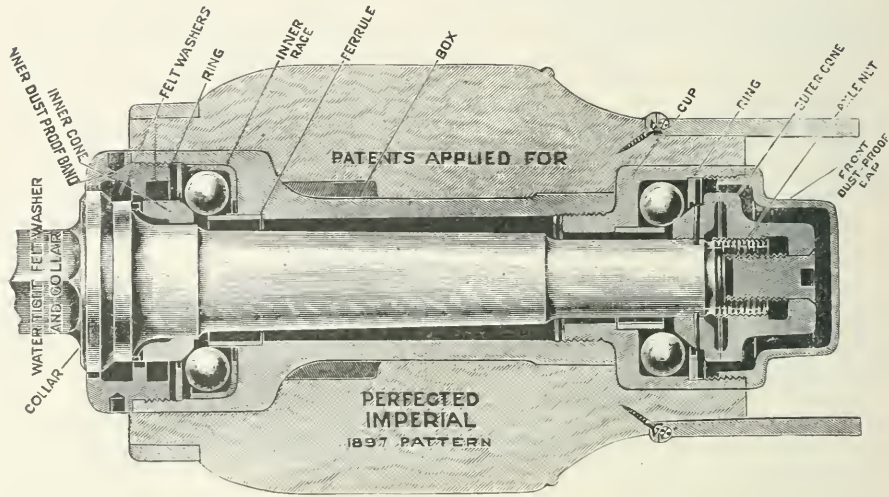
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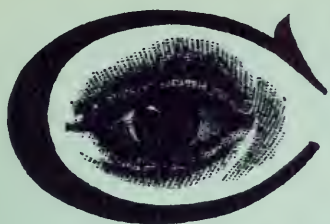
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